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THE STONE AGE CULTURES OF THE UPPER SON VALLEY

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THE STONE AGE CULTURES OF THE UPPER SON VALLEY

[MADHYA PRADESH]

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To

My Preceptors

Prof. H.D. Sankalia

Prof. A.K. Narain

Prof. S.B. Deo

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PREFACE

Man, when attained the 'Human Stage', used hard material-stone, which was easily accessible and well known to him for a greater part of the creation of the human world. He clipped it according to his necessity and desire. This span of human achievements may be termed as Stone Using Era. But in its last phase, he invented, and added, grinding and polishing technique, to his tools; and this is designated as 'Neolithic Period'. The earlier epoch of man's endeavourments, which is devoid of this new process, may be described as Flaked Stone Period; though here simply Stone Age is used.

The man possessed the artistic and technical genius and hence at times made advancements in techniques and introduced changes in types to fit in the contemporary environments. These distinct typo-technological developments of the Flaked Stone Period, which witnessed to various climatic phases, have to be divided into different ages: Early Stone Age, Middle Stone Age and, Late Stone Age. These terms in India, were first adopted by Subbarao in 1958 to distinguish the assemblages of the distinct prehistoric cultures, and in 1960 the first International Conference on Asian Archaeology recommended to use them ; although V.N. Mishra argued to apply the European nomenclatures : Palaeolithic and Mesolithic—the former's further divisions: Lower, Middle and, upper; and from seventies their use is favoured by most of the scholars. Nevertheless, all the regional lithic industries cannot be labelled with the European terms and, moreover, the Indian, Upper Palaeolithic, requires adequate stratigraphical evidence.

In India, the search of stone artifacts began as early as 1863 but a continued and well planned study in this field started with the expedition of Sabarmati by Prof. H.D. Sankalia. Later on with the idea of intensive and extensive work in his mind he directed his students to take up the regional investigations in the various parts of the country.

In the valley of the Son, except for a few attempts made mainly in its middle and a sketchy examination of the upper part, no systematic investigation was carried out. Therefore, I undertook an investigation of its upper reaches. I spent nearly seven months in the field in the years 1962, and 63; and located sixty-five sites of Stone Age Cultures in the districts of Madhya Pradesh, i.e., Bilaspur (north-western part), Shahdol, Jabalpur (only a part of Katni sub-division) and Sidhi, lying in the upper Son valley. However, several areas could not be explored merely owing to the absence of communication facilities were covered with thick but forest and infested with wild beasts. Recently some works have been done in the parts of this region but their detailed reports are still awaited. So. inspite of the fact that this dissertation is bronght out after one and half decades of its submissiong in 1966 its revision is unwanted; the delay in its publication was due to one publisher.

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In presenting the results of this work I have received constant encouragement and guidance from my *guru*, Prof. Sankalia. He always gave me his valuable time and opportunities for discussion on various topics which helped in formulating my ideas. To him I express my sincere gratitude. I am highly indebted to my *guru*, Prof. A.K. Narain who encouraged me during my stay in the Deccan College. I also express my heartfelt thanks to Prof. S.B. Deo who initiated me in the techniques of field archaeology. My sincere thanks are due to Prof. Lallanji Gopal for his encouragement I also record my thanks to Dr. V.N. Misra who made some valuable suggestions and Dr. S.N. Rajguru with whom I had an opportunity to discuss some of the problems of the Pleistocene formations. My thanks are also due to Prof. K.K. Sinha, Dr. Z.D. Ansari and G.G. Mujumdar for the keen interest they took in my work. I am also thankful to my friend Dr. A.P. Jamkhedkar who helped me in various ways, and to Shri K.S. Pappu and S.G. Supekar for going through the first draft of the typed manuscript. I offer my best thanks to my student Dr. P.N. Singh to arrange for the publication and Dr. Sri Bhagwan Singh, proprietor of M/s. Ramanand Vidya Bhawan bring to out the present work within a few months and also to read the proofs and prepare the index during my absence from the country. I also wish to make a thankful reference to Dr. J.P. Singh. My wife Hasin Fatima has been a constant source of help and inspiration in my work. My son Arif verified and corrected the alphabatical orders of the index. Some misprints and omissions have crept into my work and I have the indulgence of the readers for them.

Varanasi
27-9-1983

Nisar Ahmad

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ABBREVIATIONS

AA	*Artibus Asiae*
AI	*Ancient In dia*
AP	*Asian Perspective*
ARASI	*Annual Report of the Archaeological Survey of India*
CS	*Current Science*
BDCRI	*Bulletin of the Deccan College Research Institute, Poona*
EA	*Eastern Anthropologist*
IA	*Indian Anthropology*
IAR	*Indian Archaeology – A review*
IHQ	*Indian Historical Quarterly*
JASB	*Journal of the Asiatic Society of Bengal, Calcutta*
JAS Bomb.	*Journal of the Asiatic Society, Bombay*
JGRS	*Journal, Gujarat Research Society, Bombay*
JMGA	*Journal of the Madras Geo. Association*
JMSUB	*Journal, Maharaja Sayajirao University of Baroda, Baroda*
JPSI	*Journal Paleontological Society of India, Lucknow*
JRAI	*Journal Royal Anthropological Institute, London*
JORIB	*Journal of the Oriental Research Institute, Baroda*
MASI	*Memoir of the Archaeological Survey of India*
MGSA	*Memoir of the Geological Survey of India*
MGSU	*Memoir of the Geological Survey of Uganda*
MI	*Man in India*
PASB	*Proceedings of the Asiatic Society of Bengal, Calcutta*
PISC	*Proceedings of the Indian Science Congress*
PPS	*Proceedings of the Prehistoric Society, Cambridge*
SAAB	*South African Archaeological Bulletin*
TAPS	*Transactions of the American Philological Society*

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1

Previous Work Done in the Region

Robert Bruce Foote mentions seven palaeoliths of porcellanite discovered by Richard Oldham in the Rewah State.[1] This was probably the first discovery of palaeoliths in this region. Besides, a handaxe of creamy quartzite is also recorded by him. But the exact find-spots of all these tools are unknown. A.C. Logan in 1906 in an appendix to his book, catalogues forty palaeoliths under the headings of Bundelkhand and Rewah from Indian Museum, Calcutta.[2] In 1917, Coggin Brown who dealt with the prehistoric antiquities of the same museum registers one handaxe of dark reddish quartzite—different from Bruce Foote's specimen. It is said to have been discovered from Tiki, South Rewah by T. W. Hughes. Mesurier acquired an arrow-head from Naygurhee.

In the second half of 19th century, A.C.L. Carlleyle explored parts of this region and obtained hundreds of microliths. Unfortunately, due to his premature death, he could not publish anything on this subject. However, some notes left by him were published by V. A. Smith. Carreyle writes, "In the cold season of 1867-68, I found some small flakes, etc. of agate, jasper and chert, near Sohagi Chat on the northern scarp of the Vindhyans,[3] to the south of Allahabad district (about thirty miles from Allahabad) And I remember being then very much pleased with a particularly fine crescent-shaped object, made of white creamy chalcedonic agate, and of the same type-form as the small crescent shaped implements which some years afterwards I found in such number in caves and rock shelters on the Vindhyans.[4] He subsequently explored the parts of Rewa and collected microliths in large numbers.[5] The best specimens came from the caves and rock shelters; these were associated with chips, flakes and small cores of agate, etc. These caves and rock shelters appeared to him as habitations and working places.[6] He also carried out trial excavations in the caves and rock-shelters

1. Foote, R.B., 1916, The Foote Collection of Indian Prehistoric and Protohistoric Antiquities, Notes on their Ages and Distribution, pp. 161, 1 9.
2. Logan A C., 1906, Old Chipped Stones of India Founded on the Collection in the Calcutta Museum, Calcutta, p. 89.
3. Brown, J.C., 1917, Catalogue Raisonne of the Prehistoric Antiquities in the Indian Museum at Calcutta, p. 63.
4. Smith, V.A , 1906, Pygmy Flints, IA., XXXV, p. 185.
5. *Ibid.*, pp 185-187.
6. Brown, J A., 1389. On some small highly specialised forms of stone implements, found in Asia, North Africa and Europe, *JRAI*, Vol. XVIII, p. 136.

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of Morahana Pahār and found microliths associated with very rude pottery, which was very roughly ornamented by strokes and "geru" (red haematite). In the National Museum Dublin, microliths from two other caves, namely, Bāgh Kor and Gharwī Pahar are also kept.[1] Their exact location is not known. However, it is suggested by Smith that "they are somewhere in Baghelkhand, either in the extreme south of the Mirzapur District or in the north of the Rewah State."[2] These are local names and, therefore, it is difficult to find them on the map.

The discovery of ornamented pottery with microliths by Carrleyle is very interesting, but no further record of this excavation is found. Its description is also very scanty.

A collection of microliths made by Franks from Baghelkhand and kept in the British Museum is referred to by Gordon.[3]

Bruce Foote also records some neoliths discovered from Rewah State. But the places from where they were obtained are not mentioned except in the case of one, which was picked up by C.M. Smith, Government Astronomer, Madras, at Sadol (Shahdol) in 1896-97.[4]

The neolithic celts discovered from the Central Provinces have generally lost their details.[5] However, some neoliths including a hammerstone from Morhana Pahar[6] and another from "Rewah territory"[7] are mentioned by Brown. Thirty-one neoliths registered by him were collected by Wybrants G. Olpherts[8] at Burehenka Village, 8 miles east of Katni.

After a lapse of many years, R.V. Joshi and K.V. Soundara Rajan explored the Rewa district. They collected Middle Stone Age tools from the Son and microliths from Chorhat, topmost levels of the Son near Deoland Bridge, Chachai Falls and near the Govindgarh Tank.[9] However, the names of the sites of MSA tools are not mentioned. In a later publication, Joshi mentions that in his exploration at Markandey Bridge, he discovered a flake bladescraper assemblage *in situ* at the level of nearly 25 ft. in eroded exposures of fine sand

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1. Smith, *op. cit.*, plate facing to p. 186.
2. *Ibid.*, p. 186.
3. Gordon, D.H., 1950, The Stone Industries of the Holocene in India and Pakistan, *AI.*, No. 6, p. 69.
4. Foote, *op. cit* , p. 161.
5. Coggin Brown, *op. cit.*, p. 76.
6. *Ibid.*, p 89, Nos. 2025-2020;
   p. 91, Nos. 2094-2100.
7. *Ibid* , p. 89, No. 2035
8. *Ibid.*, pp. 104-5, Nos. 1060- 1070.
9. *IAR.*, 1957-58, pp. 25-26.

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and coarse silt.[1] However, the present author, during his exploration, could not see any trace of Joshi's section. It is very likely that it has been washed away by floods.

In 1957 V.S. Wakankar found some rick paintings in white pigment in a rock-shelter in sandstone hill two miles to the west of Katni.[2]

Tools of ESA, MSA and LSA were found by R. Sengupta from the bed of the river Son near Devalond (Deoland) Bridge in 1961.[3]

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1. Joshi, R V., 1961, Stone-Age Industries of the Damoh area, Madhya Pradesh, *A.I*, No. 17, p. 24.
2. *IAR.*, 1956-57, p. 79.
3. *IAR.*, 1961-62, pp. VI-8-9.

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2

Environments

(i) The River Son

The river Son, (Sanskrit—Śoṇa, red, crimson) a large river of Northern India rises from the Maikal range—its nominal source located at Amarkantak hill is called Sonbhadra or more commonly Sonmunda.[1] It runs first north and then east and joins the Ganges ten miles above Dinapore, after a course of about 792 Kms.

A. Origin

A small stream which falls down vertically from some 76 metres, is pointed out by the local people[2] as the Son. However, this belief does not appear convincing. The stream which is designated as the Son really falls into a small river which flows between Pendra and Amarkantak and is a tributary of the great Mahanadi. Legends[3] also explain its disappearance after falling from the hill by saying that it flows underground up to the place[4] where it re-emerges.

In fact the source of this river is at the Sonmunda—where it is seen, between Pendra and Kenda. Here is a long, narrow valley which starts about two miles south of the place where the present Pendra-Amarkantak road crosses the valley. This valley is marshy. At the junction of the valley and the road is a small tank (locally named bauli) of green water. This is regarded as the source of the Son, though really the line of marshy pools come from a long distance.[5]

B. River System

The river Son flowing from the western part of Bilaspur district enters the Shahdol district and divides it into two parts The river flows through a narrow channel and some favourable places having deep broad reaches are locally known as *dah*. Going about 145 miles

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1. Luard, C.E., and Prasad, Janki, *Rewah State Gazetteer.*
2. *The Imperial Gazetteer of India*, Vol. XXIII, p. 76
3. *ARASI*, Vol. VII, p. 235
4. *Ibid.*, p. 235
5. *ARASI.*, Vol. VII, p. 236

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to the north near its junction with Mahanadi[1] at Sarsi, it is turned in a northeasterly direction by the Kaimur scarp.[2] Besides the Mahanadi there are three other important tributaries, viz. Johilla, Banas and Gopat. The Johilla which originates from Amarkantak enters at Itahi[3] (23° 38½' N., 81° 16'E.) of Shahdol district, the Banas which comes from the right side merges with the Son at Bhanvarsena Ghat (23° 17'N, 81° 30 E.)[4] and the Gopat joins it on the right bank like Banas at Bardi (24° 32'N., 82° 29'E).[5] From this place, the river Son, after running nearly twenty miles, leaves the border of Madhya Pradesh and enters Mirzapur district of Uttar Pradesh. In the latter district, it receives from the south two tributaries, the Rihand and the Kanhar. Leaving this district and turning in a north-westerly direction, it passes separating the district of Shahabad from Palamu and through Gaya and Patna till it finally falls in the Ganges,[6] (25° 40° N., 84° 59'E.) at Maner.[7]

C. The Old Channel

J.D. Beglar tried, in the second half of the 19th century, downstream, to find out the old course of the Son. He writes, "The old course of the Son was by modern villages of Daudnagar and Tararah (about 60 miles above its present junction with the Ganges), past with the villages of Rampur – Chai, Kyal, Kojhasa, Chandhos-buzurg, Bhita, into the Murhar and then via Mohiuddinpur Khera and Fatehpur Katan into the Ganges at Fatuha."[8] In addition to his arguments he adds that "close to Mohiuddinpur Khera, there is an extensive jhil or lake, evidently the remains of the old bed, and that excavations at Sonmayi, a village three miles south-east of Mohiuddinpur Khera, and 1½ miles south of the great jhil, yield coarse yellow sand and pebbles precisely resembling what are well known as the Son sand and pebbles."[9] 'Tarārh' or 'Karār' means the high bank of a river and the name of the

---

1. Mahānada mentioned in ancient literature replaced by the name Jyotirathā in *Varāha Purāṇa* or Jyotirathyā in *Mahābhārata* is identified with this river (Law, B.C., Geographical Essays, Vol. I, p. 110)
2. The place of their junction is known as Mārkandeya.
3. This place is shown in 1 inch to 1 mile map (64 E/26). But in the *Gazetteer of the Rewah State*, the meeting place is mentioned as Barwahi at 23° 37' N. and in the *Imperial Gazetteer*, Vol. XXIII, p. 77, it is Barwalu village. In the Survey sheet, no villages of these names are shown at the junction of Johilla and the Son. However, one village known as Barauli, having similar sound, may be taken as the same. But that is nearly three miles upstream from the junction.
4. 63 H/11—15
5. 63 L/6
6. *The Imperial Gazetteer*, Vol. XXIII, p. 76
7. 72 C/14
8. Beglar, J.D., Report of the Archaeological Survey of India, Vol. VIII, p. x
9. *Ibid.*, p. x

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village itself suggests that once it had been a high bank of a river.[1] Son-Bhadra,[2] the Son appears to have flowed in the old time to the present bed of the Punpun near Chandos-buzurg. After this place, it or at least a branch crossing over from the bed of the present Punpun river appears to have taken the course of the bed of the present Murhar river. It ran in the bed of the present Murhar river till it finally joined the Ganges at Fatuha. The rounded pebbles are found in parts of the bed of Murhar river, similar to the well known pebbles of the Son.[3]

It is possible that a portion of the Son waters after crossing the intervening country at Masouri Buzurg and Sānda ran into the bed of the present Dardha—revealed from the patches of sand lying at Masouri.

M.P.B. Duell holding the above opinion writes, "I believe it wandered from its present channel between Urwal and Daudnagar, crossed the Patna branch road north of Masouri, entered the Punpun, and thence flowed partly into the Ganges at Futwah, and partly along the course of the Maithwan Nuddy towards Mongir.[4]

However, the Son, due to unknown cause in its downstream, left its original bed and adopted the present course sometime before the conquest by the Muslims. The result of the new force would have pushed the Ganges to the north producing a large tract of newly formed land between Arrah and the Ganges,[5] the junction of these rivers.[6]

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1. *Ibid.*, p. 7
2. The local people point out that the name Son-Bhadra is given to a ford where the pilgrims cross the river of Son while going to Gaya.
3. The local tradition has a story for these pebbles. Once a marriage procession of a merchant halted at this place. The members of the party were provided with the food consisting of bread paste rolled into balls and cakes. A fakir went there and begged for a share of it. In reply to his begging they said to him, "none of us have eaten; do you want stones to eat?" Thereupon the fakir left the place saying, "may all your food turn into stones." (Beglar, *op. cit.*, pp. 8-9)
4. *Ibid.*, p. 9
5. Beglar, *ap. cit.*, p. 23
6. A statement of Patanjali (*Annusonam Patalipuram*) –"Pataliputra was situated on the Son" also proves that in his time it flowed down to this channel.

   Strabo states that Pātliputra is situated at the confluence of the Ganges and another river; that it is in length 80 *stadia* and in breadth 15 (Falconer's and Hamilton's translations, Vol. III, p. 97). "This river was named Erranoboas according to Arrian, and was of third degree magnitude among India's rivers and inferior to none but the Ganges and Indus" (Rennel, *Memoir of a map of Hindostan, or the Mughal Empire*, 1793, p. 49). It is mentioned as Soa by Ptolemy (Ptolemy, ed. by Surendranath Majumdar Sastri, 1927, p. 99) Megasthenes calls it 'Hiranyavaha' (McCrindle—*Megasthenes and Arrian*, pp. 135, 187).

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Beglar and some scholars do not identify the rivers mentioned by ancient writers with the Son. The former writes that "It is by no means quite so clear that the Erranoboas, the Hiranyavaha, and the Son are identical; on the contrary if the city of Palibothra stood at the confluence of the Ganges and the Erranoboas, and if its site now be correctly represented by Patna, then it would appear that the Son and Erranoboas are distinct rivers" (*Ibid*, p. 4). He further says that "the position of Patna as being on, or at least very near the site of Pātaliputra is too well established to be shaken by this, and against this position the objection is invalid. But as in the vicinity of Patna several rivers join and did join the Ganges, the argument maintains its full force against the identification of the Erranoboas with the Son; had there been but one river joining the Ganges it would be clear that the two were both names of the same river; as it is no less than four tributaries join and did join the Ganges not far from Patna: any one of which, except the Saryu, would fulfil the condition of having its confluence with the Ganges, not near, but at Patna, and this is the Gandak" (Ibid., p. 5). Wilson holds that the Son and the Erranoboas cannot be taken as the same because both Pliny and Arrian mentioned them as different rivers (Wilson, H.H., *Select specimens of the theatre of the Hindus*, Vol. II, p. 136). It is not unlikely that a branch of the Son met the Ganges near Patna.

The traditon also supports this supposition. From the descriptions mentioned in the *Rāmāyana*, it is made out that the river Son had the course, which has been suggested above in the time of its composition.

When Vishvāmitra accompanied Rāma to protect his sacrifices, they journeyed along the Sarayu for two days, crossed it on the third, and the same day they reached Vishvāmitra's hermitage. And from there they went north Mithila, and then they travelled to the north (Griffith's *Rāmāyana*, I, p. 158). At the close of the first day's journey from Vishvāmitra's hermitage, they halted on the banks of the Son; here Vishvāmitra, on Rama's enquiry, says (Ibid., pp. 16) :—

"And Vasu bade his city fair
The name of Girivraja bear
This fertile spot whereon we stand,
Was once the high-souled Vasu's land.
Behold: as round we turn our eyes,
Five lofty mountain peaks arise."

The above passage clearly indicates that from the banks of the river Son where they halted, the Rajgir mountains were clearly visible. From no part of the banks of the present channel the Rajgir is seen. Hence it indicates that the present bed of Murhar river from where the Rajgir hills are located was the bed of the Son.

The *Mahābhārata's* statement – Krishna, Arjuna and Bhīma passing the jungles and countries and crossing the rivers of Ganges and Son entered the boundary of Magadha Kingdom (*Māhābharata*, Translation by Pratap Chandra Roy, Vol. II, Sabhaparva, p. 51) – shows that the river Son in those times flowed between Patna and Rajgir—the course which has been indicated before.

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In Mirzapur "there is evidence of slight recent rejuvenation".[1] though Oldham attributes it to the extensive clearing the forests.

D. Physiography

The river Son is remembered in Indian geography for its striking hydrography-not having any important tributary from the north.[2] For this peculiar feature it is worthwhile to describe the physical geology of the valley.

On the south, however, it has a number of tributaries, the sources of which reach a straight distance of nearly a hundred miles from the main stream and therefore, "the Son drainage system is consequently one-sided and in this is exceptional among river valleys of so large a size."[3]

The absence of big tributaries at the northern side can be explained by two facts.

Firstly, the Kaimur scarp, which stands in the north of the Son valley, is formed by the harder upper Vindhyan sandstones, after the removal of the softer beds of the Lower Vindhyans.[4] Therefore, except a few insignificant places, it could not be breached at a single point by any stream flowing northwards.

Secondly, as the river Son was flowing along the foot of Kaimur scarp, from the

---

The next occurrence of the Son is in the *Mudrā Rāksasa*, where the Son and successor of the king of the mountain leading an army against Pātaliputra, says (Wilson, *op. cit.*, p. 214) :—

"Then let us march, our mighty elephants
shall drink the Son's dark waves and echo back
The roaring of its waters; spread through the groves
That shade its bordering fields intenser gloom
And faster than the undermining torrent
Hurl its high banks into the boiling stream
Then rolling onwards like a line of clouds
That girts in rain and thunders Vindhya's peaks
Environ with portentious storm the city
And lay its proud walls level with the ground."

This passage clearly shows that at that time, the river Son ran to the west of Patna.

1. Spate, O.H.K., 1954, *India and Pakistan*, p. 583
2. Spate, O.H.K., *op. cit.*, 12.
3. Oldham, R.D., Geology of Son Valley in the Rewah State and parts of the adjoining districts of Jabalpur and Mirzapur, *MGSI.*, Vol. XXXI, Pt. I, p. 44.
4. *Ibid.*, pp. 44-45.

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junction of Mahanadi to Sahasaram, no stream coming from the gap of the scarp can persist its course further.[1]

The geological formations were totally responsible for establishing this peculiar hydrography.

In the Vindhyan period, when the mountain row was present, the course of drainage was northwards from the mountains crossing the plain of deposition in which the Vindhyan system was being laid, but later in Gondwana time when the mountain chain subsided it probably shifted to south and till early tertiary times the whole area was exposed to the subaerial denudation and no encroachment of the sea could take place. It is certain that any change which took place in those days could not help to accumulate the deposits sufficiently extensive to have been preserved till the present day. However, because of subaerial denudation this region got peneplained in post-early-Tertiary period [2] It is likely that a surface with low relief occurred gently sloping from high Gondawana plateau, north-east to south. The Gopat Valley crossing the transition area may still point to the general course of one of the rivers of this time.[3] The great Kaimur scarp must have come up at this time and not away from its present position, but likely having a less elevation than now above the general surface. The Lower Vindhyan outcrops probably occupied a low-lying region in high grounds fromed by the harder formations. Probably the present course of the Son came into existence after the great change—the formation of Upper Vindhyan Kaimur scarp which prevented any stream to join it from the north. It also appears "if the Son had not previously been evolved as a river carrying off the drainage of the country south of the main area of the Upper Vindhyan, it then cut its way back along the outcrop of the soft beds of the Lower Vindhyan secries and diverted the drainage to the eastwards."[4]

It is very difficult to say that the present valley of the Son had been a main drainage channel, in olden times, as no valley had been made on its north side. At the present, the streams coming from the north are very few and insignificant. The most important among them is the Ghagar which joins in the middle, near Chopan in Mirzapur district.[5] For the river Ghagar and others coming from the northern side, Oldham writes, "all have been most unmistakably formed by cutting back from the low level of the Son Valley."[6]

The absence of tributaries from the north may explain a recent origin of present valley' but on the other hand the absence of wind gaps in the Kaimur scarp indicates its

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1. Oldham, R D , Geology of Son Valley in the Rewah State and parts of the adjoining districts of Jabalpur and Mirzapur, *MGSI.*, Vol, XXXI, Pt. I, pp 45 46.
2. *Ibid.*, pp. 46-47.
3. Oldham, R D., Geology of Son Valley in the Rewah State and parts of the adjoining districts of Jabalpur and Mirzapur, *MGSI.*, Vol. XXXI, Pt. I, p. 47.
4. *Ibid.*, p. 48.
5. Oldham, R.D., Geology of Son Valley in the Rewah State and parts of the adjoining districts of Jabalpur and Mirzapur, *MGSI* , Vol. XXXI, Pt. I.
6. *Ibid* , p. 51.

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antiquity.[1] The other geomorphological evidence suggests that the Son's course was made firm at a time when the form of the surface was determined by the conditions different from those it is now dependent on and has been exhibited on the present surface features.[2] Further the Son in general flows through softer geological formations, while it takes abrupt southerly turn through a narrow gap in the higher reach of basal quartzites of Lower Vindhyans. The only period, to which the original course of the river Son in this southern bend, can be alluded is that age of peneplain. In that period the relief of land must have been lower than today, and the river Son must be running in an open shallow valley most probably to have been largely occupied by alluvium. The river had the liberty to move from side to side. The present ridge of the basal quartzite was either completely buried or exhibited by a few knolls of rock. When the formation of Upper Vindhyan took place, it flowed in bend crossing the outcrop of the basal quartzites in a narrow channel. The result was that the rivers started to cut down their channels, the course of the Son was established firm and wherever it can across the harder rocks, was forced to preserve its position through the range of basal quartzites which gradually grew in height as the ground on either side was lowered at a greater rate than the crest of the ridge."[3]

However, now the streams are nearly in graded condition and the surrounding hills are degrading very slowly. The changes in drainage system by stream-piracy are local and probably have not affected the general course.[4]

(ii) Geology

The geology of this region forms one of the richest chapters of Indian geology, but the study, of prehistoric relics only requires a very general picture of various formations as they have played an important role in the history of Stone Age Man.

The chief formations occurring in the Valley are :

Recent to sub-recent		) Black soil and alluvium
Pleistocene		) Silt II) Gravel II) Silt I) Gravel I) Laterite ↓
Tertiary	(Upper	(?)
	(Middle	Absent
	(Lower	Deccan Trap ↓
Secondary	(Upper	
Primary	(Gondwana	(Upper
	(	(Lower
	(Vindhyans	(Upper
	(	(Lower
	(Purana formation — Cuddapah	

1. *Ibid.*, p. 52.
2. *Ibid.*, p. 53.
3. Oldham, R.D. Geology of Son Valley in the Rewah State and parts of the adjoining districts of Jabalpur and Mirzapur, *MGSI.*, Vol. XXXI, Pt. I, pp. 53-54.
4. *Ibid.*, p. 55.

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One of the most ancient rocks occurring in the valley are Cuddapah conglomerates, containing pebbles of red jaspers, Purana slates and porcellanites. The Purana formations have been traversed by dolerite and amphibolite dykes and quartz veins at many places.[1]

The Lower Vindhyan outcrops are seen lying only on the brink of the irregular Vindhyan basin[2]—at the base of Kaimur scarp extending 240 miles along the Son Valley and disappear at the watershed of the rivers of the Son and the Narbada beneath the Upper Vindhyans which run there to join Purana rocks.

However, the classification of Lower Vindhyan is not as clear as of Upper Vindhyan. Both the groups exhibit a great mark of difference—the Lower inconsistent and invariable; the Upper persistent and uniform. The difference in nature is because of vulcanocity and earth movement in the region. In the valley proper, Lower Vindhyans are generally overlain by Upper Vindhyans—in the form of Kaimur scarp. The Lower Vindhyans, consisting chiefly of limestone and shales, can be easily distinguished from Upper Vindhyans consisting mostly of hard sandstones. The Lower Vindhyan "rests with the unconformity upon the Bijawars or ganeiss, out of whose debris their lower beds have been partially formed and is mainly a shallow-water series." This group is chiefly formed by shallow water marine deposits. It is a'so strongly joined like the Kaimur.[3]

Further porcellanite rocks occur commonly in the valley They are generally found lying above and below the Lower Vindhyan formations They are hard, varying in colour from almost black to a pale green, and breaking with a conchoidal fracture into extremely sharp edge splinters. The latter features of the rock, combined with its evenness of grain, made it a favourite material for Stone Age Man in this region; many singularly perfect specimens of large-sized axes and choppers as well as small flakes made on this material have been found.

In the west of Ramnagar sandstones and limestones occur. Chert occurs as irregular patches and bands in limestones. In these rocks, ripple marks, sun-cracks, rain prints are commonly found.

The above features and the roundness of quartz grains from sandstones indicate semiarid climate during Lower Vindhyan times in this region. There is also a very slight and doubtful evidence of organic life in Lower Vindhyans.[4]

Following the Lower Vindhyan, the Upper Vindhyan of great thickness yields probable evidence of life of early Palaeozoic period. The Upper Vindhyan is vitally arenaceous, but the Lower Vindhyan, on the whole, is argillaceous and calcareous. In a few places a clear unconformity is observed between the two groups—Lower and Upper Vindhyan. "The area occupied by Upper Vindhyan rocks, especially in their eastern extension, is well marked

1. Pascoe, E.H., 1950, A Manual of the Geology of India and Burma, Vol I, pp. 292-293, 380.
2. *Ibid.*, p. 500
3. Pascoe, E.H., 1950, A Manual of the Geology of India and Burma, Vol. I, pp. 501-4.
4. Pascoe, E.H,, 1950, A Manual of the Geology of India and Burma, Vol., I pp. 504 7

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off from the surrounding country, both by the greater elevation of its plat-au, and by the clearly cut escarpments by which it is almost everywhere bounded. Without exception the most prominent features of the Vindhyan area are its numerous escarpments."[1]

The good outcrops of Gondwana occur in the Upper Son Valley.[2] Plant fossils also commonly appear there.[3] The rocks in the southern Rewah and northern Sarguja lying across the tributaries of the Son and spreading westwards into the district of Jabalpur are known as Upper Gondwana beds.[4]

Deccan traps occur in the upper part of the Johilla Valley and also in its source region near Amarkantak.[5] Laterites are found to cap Daccan traps at many places in the upper-most parts of the valley. They also occur in non-basaltic regions.

Much work has not been done on the pleistocene deposits. However, the present investigation shows that very likely during this period the coarse gravel layer was formed and capped by a layer of silt; similar deposits were also found in the Late or Upper Pleistocene. In the valley of the Son, especially in the Upper and middle parts, a little alluvinm is noted.[6] In the view of Spate, a big area of yellow 'sub-tropical steppe' soil—a part thickly forested—lying in the Upper Son is inexplicable.[7]

(iii) **Climate**

The region, in general, has a healthy climate. The average maximum and minimum temperatures recorded in the coldest month of the year, i.e. in January are 76° and 48°F, while they are 106° and 85°F in the month of May. The diurnal range of temperatures in the month of January is 27° while it is only about 12° in the month of July. The humidity, winds etc. show great variations in their intensities and directions in different seasons of the year. The Vindhyan and Satpura ranges have considerable influence over the various climatogenic factors in the Son Valley. The average annual rainfall is between 50"-60" and mainly occurs from June—October. The region receives light showers in January and February.

(iv) **Rainfall**

The Bilaspur district receives nearly 50" of rain. The rainfall in Shahdol district is 52". The average rainfall in Jabalpur district is 59", but its Murwara sub-division gets less than that. The rains also fall in the winter in the month of January or the beginning of February.

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1. *Ibid*, pp. 517-18
2. *Ibid.*, p. 910
3. *Ibid*, pp. 947-48
4. Pascoe, E.H., 1950, A Manual of the Geology of India and Burma, Vol. I, p. 972.
5. *Imperial Gazetteer of India*, Vol. VI, p. 185.
6. Spate, *op, cit.*, p. 583.
7. *Ibid*, p. 89.

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Soil

In the extreme upper part of the Son Valley brown or yellow clays occur which are called *dorsā* or *matāsi*. The districts of Shahdol and Sidhi possess four types of soils, i.e. black soil, lighter yellow coloured soil, light brown and strong soil which are locally called as *mār*. *sigon*, *dumat* and *bhatta* respectively. In the sub-division of Murwara generally the soil is sandy.

(v) **Vegetation**

The Upper Son Valley is notable for having very extensive forests. They contain *sāl* (*shorea robusta*), *tendū* (*Diopsopyros tomentosa*), *dhawa* (*Anogeissus latifolia*), *Terminalia*, *Khair* (*Acacia Catechu*), *mahua* (*Bassia latifolia*), *achār* (*Buchanania latifolia*). *Kusam* (*Schleichera trijuga*), *harra* (*Terminalia Chebula*), *Chhicula* (*Bassia butyracea*), *sāg* (*Tectona grandis*), *shīsham* (*Dalbergia Sissoo*) *and babūl* (*Acacia arabica*).

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3

Extent of the Survey and Location of Sites

For discovering the prehistoric relics, a survey of the Upper Son Valley was started in February 1962. In two season in 1962 and '63, the districts of Jabalpur (only a part of Katni sub-division), Shahdol, Sidhi and a part of Bilaspur, lying in the upper Son Valley, were explored. As the result, sixty-five Stone Age Sites were located. However, some parts of this Valley could not be surveyed in the absence of communications. The two big tributaries, viz. the Banas and the Gopat (except a two places) were left unexplored, as they are covered with thick forests.

All the Stone Age sites noticed in the region by the author are registered in the following table, together with the number of tools of each category at each site.

No.	*District*	*Site*	*River*	*Hill*	*ESA*	*MSA*	*LSA*
					No. of tools		
1	Bilaspur	Navatola	Son		4	—	—
2	,,	Slamtola	,,		7	—	—
3	Shahdol	Bicharpur	Tipan		8	—	1
4	,,	Samatpur	Chandas		2	9	8
5	,,	Anuppur	,,		2	8	—
6	,,	Bakahi	Son		—	2	37
7	,,	Harha	,,		4	1	—
8	,,	Harhi	*Nallah*		1	—	—
9	,,	Lalpur	Sarpa		—	17	5
10	,,	Kanchanpur	,,		—	8	6
11	,,	Singrauli	Son		—	4	—
12	,,	Ruhanian	,,		—	3	5
13	,,	Sohagpur	Murna		—	—	7
14	,,	Shahdol	,,		—	48	12
15	,,	Kalianpur	,,		—	3	3

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1	2	3	4	5	6	7	8
16	Shahdol	Fatehpur	Murna		—	7	3
17	,,	Diruria	Bagaiha		—	10	5
18	,,	Khanarait	,,		—	6	4
19	,,	Banduha	Anrar		—	2	9
20	,,	Bargaon	,,		—	2	13
21	,,	Gorai	Johilla		—	—	9
22	,,	Barachanda	,,		6	11	21
23	,,	Ginjiri	,,		2	4	4
24	,,	Umaria	Umrar		3	6	16
25	,	Ghanghari	,,		2	6	6
26	,	Loharganj	,,		—	5	7
27	,,	Markandey	Junction of Mahandi-Son		12	6	3
28	,	Kusarwar	Chundi		—	—	41
29	,,	Mau	Sumdeen		—	—	11
30	Jabalpur	Basari	Mahanadi		12	23	37
31	,	Suddi	,,		1	7	2
32	,,	Bhadora	Umrar		3	11	9
33	,	Bhimpar	Mahanadi		—	5	6
34	,,	Banjari	Jhepawan		5	—	—
35	,,	Bijeragho-garh	,,		—	—	7
36	,,	Murwara	Katni		12	—	—
37	Sidhi	Bhanvarsen	Son		8	16	6
38	,,	Ghitora	,,		4	8	—
39	,,	Kua	',		—	—	13
40	,,	Barhai	,,		—	8	19
41	,,	Rajghat	,,		—	12	5
42	,,	Akaori	,		3	12	—
43	,,	Margati Hill	Hill		—	—	20
44	,,	Bangama	,,		3	6	7
45	,,	Bhelki	Deonar		—	4	6
46	,,	Sidhi	Sukha		—	—	15
47	,,	Parnia	Hiranya		4	9	12
48	,,	Gara	*Nallah*		1	27	6
49	,,	Nowreha	Hill		—	—	6

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1	2	3	4	5	6	7	8
50	,,	Jhuko	Gopat		1	1	—
51	,,	Deosar	Mohan		1	—	—
52	,,	Majona	,,		1	—	8
53	,,	Jogdah Bridge	Son		—	12	7
54	,,	Jogdah Hill		Hill	—	5	9
55	,,	Ramnagar	,,		7	21	4
56	,,	Hinoti	,,	Hill	—	—	299
57	,,	Babboori	,, ESA, MSA	Hill LSA	2	10	70
58	,,	Nakjhur	Son		2	—	—
59	,,	Sihawal	,,		35	64	26
60	,,	Baghor	,,		13	29	5
61	,,	Laowar	,,		2	1	—
62	,,	Burdi	Gopat		2	—	—
63	,,	Khairpur	Son		1	9	8
64	,,	Beeche	,, MSA, LSA	Hill ESA	1	14	5
65	,,	Khaira	Son		—	3	9
		Total			167	485	862
		Gross Total			1514		

The sites with the stratigraphy of the cliff sections, wherever they are noticed, are described in detail here. The total number of the artifacts obtained from these sites and their cultural horizons are also recorded.

First the sites in the Bilaspur District are mentioned, beginning with the upper reaches of the river Son.

SITES IN BILASPUR DISTRICT

Navatola[1] 22° 48′, 82° 3′

This village is situated on the left bank of the river Son, nearly 10 Km downstream from its source. Here the cliff section shows from bottom upwards; highly compact kankars

1. 64 J/1 1 inch=1 mile map

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mixed with a few pebbles 1.5240 m dark brown sandy silt 3.6576 m and black brown soil .1550 m. Four ESA tools were obtained from the bottom layer. (Pl. XIII)

Slamtola[1] 22° 49′, 82° 4′

Downwards on the left bank of the above river is Slamtola. Here the cliff section also exhibits the pleistocene deposits of Navatola section. Kankars mixed with a few pebbles 1.8288 m. sandy dark brown silt 4.5720 m. and black brown soil .1600 m The lower deposit yielded seven ESA tools.

SITES IN SHAHDOL DISTRICT

Bicharpur[2] 23° 2′, 81° 49′

It is situated on the bank of the Tipan. From the bed of the stream, eight ESA and one LSA tools were found.

Samatpur[3] 23° 8′, 81° 44′

This is a small village on the right bank of the Chandas, a small tributary of the Son. Two ESA, nine MSA and eight LSA tools were picked up from the vicinity of this village.

Anuppur[4] 23° 7′, 81° 44′

Formerly Anuppur village was one Km. away from the Anuppur railway station. Now many houses have come up near the station Therefore, it has become a small town. Two ESA and eight MSA tools were discovered near the railway bridge, which is on the Chandas.

Bakahi[5] 23° 13′, 81° 40′

It is situated on the left bank of the river Son. Two MSA tools were lying with loose sandy gravels, a little away from this village, on the right side of the river bed. It seems that these tools had been eroded from the sandy gravel, which rested against rock. LSA tools were noticed on the top of the right bank in a good number. Thirty-seven were picked up from them.

Harha[6] 23° 17′, 81° 34′

This place is on the left bank of the above river. Four ESA and one MSA tools were discovered here. The tools of the former are heavily rolled while the latter are fresh.

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1. 64 J/1
2. 64 E/12+16
3. 64 E/12+16
4. *Ibid.*
5. 64 E/12+16
6. 64 E/11+15

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Harhi[1] 23° 16′, 81° 34′

Harhi is 1½ Km south of Harha. Near this village from a *nallah*, one slightly rolled ESA tools was found.

Lalpur[2] 23° 16′, 81° 32′

This big village is situated on the left side of Shahdol-Amarkantak road on the river Sarpa, a small tributary of the Son. MSA and LSA tools were lying in good number to the north of this village. As here the river passes through the hill, no section was found from which the stratigraphic position of two different industries could be ascertained. However, one important point was noticed. Some MSA tools were seen buried under the greyish soil. This phenomenon was observed in the cliffs of water-shed *nallah* LSA implements were lying on the surface of the morum on at places or the greyish soil. This site looked like a factory site, as flakes, cores, finished and unfinished tools occurred there. Seventeen MSA and five LSA tools were obtained from here.

Kanchanpur[3] 23° 15′, 18° 30′

This place is situated nearly 2 Km. to the west of Lalpur, on the left bank of Sarpa nadi. Eight MSA and six LSA tools were found from the bed and bank of the river respectively.

Singrauli[4] 23° 24′, 81° 27′

This small village is situated on the right bank of the river Son in the Sohagpur Tahsil. Four MSA tools were found from the loose sandy gravels opposite to this village.

Ruhanian[5] 23° 25′, 81° 27′

This place is further down on the Son. Three MSA tools were picked up from the bed of the river. Here some thin patches of sandy gravel were lying on the rock. But no *in situ* tool was noticed in them. Tools found from the bed were probably eroded from this section. Five LSA tools were picked up from the bank of the stream.

Sohagpur[6] 23° 19′, 81° 24′

This is a small town on the right bank of the *Mura nadi*, a small tributary of a Son, and the head-quarter of Sohagpur sub-division of Shahdol district. Seven LSA tools were picked up from the bank of the *nadi*.

Shahdol[7] 23° 18′, 81° 24′

It is a town on the right bank of the above nadi and the head-quarter of the district. Here the tools are found from the following localities.

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1. *Ibid.*
2. *Ibid.*
3. *Ibid.*
4. 64 E/3+7
5. *Ibid.*
6. *Ibid.*
7. *Ibid.*

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Loc. I (Near the Government Degree College :—

Here, on the right bank of the nadi, twenty-seven MSA implements were found.

Loc. II (Near the Railway Bridge) :—

This locality is just a furlong upstream from the locality I. Here one section on the left bank of the Murna nadi was noticed, showing from bottom upwards :—

Black brown soil	—	.25 m
Dark brown silt	—	.91 m
Cemented pebbly gravel	—	1.24 m
Rock-bed	—	.34 m

Thirteen MSA tools were collected from the loose gravels lying on the banks of the stream.

Loc. III (Near Road Bridge) :—

It is two furlongs to the upstream from the locality II. Seven MSA tools were picked up from the left bank. Twelve LSA tools were also discovered from the bank.

Kalianpu.[1] 23° 17′ 81° 23′

It is just near Shahdol town, standing on the left bank of the above nadi. Three MSA and three LSA tools were picked up from the bank of the nadi.

Fatehpur[2] 23° 16′, 81° 25′

Fatehpur is a small village on the right bank of the above nadi. Seven MSA and three LSA tools were picked up from the bank of the nadi.

Diruria[3] 23° 16′, 81° 22′

This small village stands on the left bank of the Bagaiha nadi, a contributary of Murna nadi. Ten MSA and five LSA tools were found opposite to this village.

Khanarait[4] 23° 15′, 81° 21′

This is a village on the left bank of the above nadi. Six MSA and four LSA tools were discovered from the bank of the river near this village.

Bandhua[5] 23° 18′, 81° 22′

This small village stands on the left bank of Anrar nadi, a tributary of the Murna nadi Two MSA and nine LSA tools were picked up from the bank of the nadi.

Bargaon[6] 23° 18′, 81° 21′

This place is on the left bank of the above nadi. Two MSA and thirteen LSA tools were collected from the bank of the nadi.

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1. 64 E/3+7
2. 64 E/3+7
3. *Ibid.*
4. *Ibid.*
5. *Ibid.*
6. 64 E/3+7

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Gorai[1] 23° 21′, 81° 5′

This village is on the right bank of Johilla, a big tributary of the Son. Nine LSA tools were picked up from the bank.

Barachanda[2] 23° 21′, 81° 4′

This place is nearly 2 Km from the Gorai village and 2½ Km south-west of Birsinghpur on the same river. There is a cliff-section on the right side of the road running from Birsinghpur to Dindori having the following deposits :—

Black brown soil	—	.70 m
Yellow brown sandy silt	—	1.51 m
Slightly consolidated pebbly gravel	—	4.57 m
Dark brown sandy silt	—	1.15 m
Slightly consolidated bouldery and pebbly gravel	—	6.60 m
Rock bed	—	1.51 m

(Pls. II, III, XVII)

The intervening silt between gravel I and II does not appear to form a continuous deposit for a considerable distance of about one Km.

One chopping-tool and two MSA tools of chert were found from the lower gravel, while five MSA tools were found *in situ* from the second gravel. Five ESA and four MSA tools were also collected from the gravel bed of the river.

Twenty-one LSA tools were found from the top of the bank.

Ginjiri[3]

On the bank of the above river is the village of Ginjiri. Two ESA and four MSA tools were discovered from the river bed, which were lying with the gravels, and four LSA from the top of the left bank of the stream.

Umaria[4] 23° 31′, 80° 50′

It is a small town and the head-quarters of the tahsil (sub-division) of the Shahdol district. Through this town one nadi called Umrar, a tributary of the Mahanadi flows. Three ESA and six MSA tools were discovered from the loose-gravel bed while sixteen LSA tools were picked up from the top of the right bank.

Changhari[5] 23° 33′, 80° 51′

This small village is situated on the right bank of the above nadi. Two ESA and six

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1. *Ibid.*
2. *Ibid.*
3. 64E/3+7
4. 64/A/14
5. 64 A/14

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MSA tools were found from the river bed whereas six LSA tools were collected from the surface of the right bank.

Loharganj[1] 23° 33′, 80° 50′

This village is on the left bank of the above nadi. Five MSA tools were collected from the loose gravel bed and seven LSA tools from the bank's surface.

Markandey[2] 24° 6′, 81° 3′

This place, where the Son is joined by its tributary Mahanadi, is known as Markandey. This name is not mentioned in one inch to one mile map of the Government of India. Possibly it is named after the present *raja* of Rewa. Seven ESA and four MSA tools were found from the bed of the stream.

Hundred yards away from this place, the gravel lying in the Son-bed yielded five ESA and two MSA tools. Three LSA tools were picked up from the right bank of the Son.

Kusarwar[3] 23° 40′, 81° 25′

This small village stands on the north and nearly 1 Km away from the Chundi nadi. LSA tools – finished and unfinished – with cores were lying on the right bank of the river, near the bridge. Forty-one tools were picked up from here (Pl. V)

Mau[4] 24° 5′, 81° 24′

Eleven LSA tools were picked up from the bank of the Sumdeen nadi near this village, which is 7 Km away from Beohari town.

SITES IN JABALPUR DISTRICT

Since the Son basin is the main focus of my studies, only that part of this district was investigated through which the tributaries of the Son flow, viz a part of Katni sub-division.

Basari[5] 23° 50′, 80° 38′

This big village stands on the left cliff of the Mahanadi river. Eight ESA and five MSA tools were found from the loose gravel bed. The remains of one washed section was seem opposite to this bank, six LSA tools were obtained from the bank.

From the hill, which is near Basair and on the same bank of the stream, four ESA, eighteen MSA and thirtyone LSA tools were collected.

Suddi[6] 23° 51′, 80° 37′

On the same bank of the above river, is the village of Suddi. MSA tools were lying in good number in the north of this village near the bank of the stream. This place also appears to be a factory site as chips, flakes and cores were in a majority. But only three

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1. *Ibid.*
2. 63 H/4+8
3. 64 E/2+6
4. 63 H/4+8
5. 64 A/9
6. *Ibid.*

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finished tools and four flakes were taken from there. From the vicinity on this village, two LSA tools were also obtained. One hand-axe was found in the bed of the river.

Bhadora[1] 23° 51′, 80° 39′

This village is situated on the left bank of the Umrar nadi. Three ESA eleven MSA tools were collected from the bed of the river while nine LSA tools from the bank.

Bhimpar[2] 23° 59′, 80° 39′

This village is on the right bank of Mahanadi in the Bijeraghogarh Pargana of Katni tahsil. Five MSA and Six LAS tools were obtained from the bed and the bank respectively.

Banjari[3] 23° 59′, 80° 37′ (Pl XVI, Fig. 1)

This place is situated on the left bank of Jhepawan nadi, a tributary of Katni nadi. Opposite this village one cliff section was observed with the following horizons :—

Black brown soil	—	.20 m
Dark brown silt	—	2.14 m
Cemented bouldery pebbly gravel	—	2.43 m

Five *in situ* tools were taken out from the gravel.

Bijeraghogarh[4] 24° 0′, 80° 37′

This small town is situated in the headquarter of a 'Block' of the Murwara sub-division. Through this town the above stream runs From the bank of it, five flakes and two finished tools of LSA were picked up.

Murwara[5] (Katni) 23° 51′, 80° 24′

This town, also known as Katni, is the headquarters of the Murwara sub-division. In the nothwest of this town, near the wind mill, on the Katni nadi two sections were discovered. One of them was on the right bank having the following deposits :—

Black brown soil	—	.25 m
Yellow brown silt	—	3.66 m
Highly Kankarised silt	—	.91 m
Cemented bouldery and pebbly gravel	—	2.43 m

Seven ESA tools were obtained *in situ* from the gravel. Five loose ESA tools were also lying there.

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1. *Ibid.*
2. 64 A/9.
3. *Ibid.*
4. *Ibid.*
5. 64 A/5

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The second section was hundred yards away from the former with the following deposits :—

Black brown soil	—	.30 m
Yellow brown silt	—	3.80 m
Highly Kankarised silt	—	.85 m
Cemented bouldery and pebbly gravel in the bed	—	.61 m

(Pls. IV, XVI, Fig. 2)

SITES IN SIDHI DISTRICT

After Markandey, the river Son was examined at Bhanvarsen in the Sidhi District.

Bhanvarsen[1] 24° 17′, 81° 30′

This is a ghat on the Son, near the village Shikarganj. The gravels lying there yielded six ESA tools, and sixteen MSA tools were picked up from the gully made on the right bank during the rainy season. From the same bank, six LSA tools were also collected.

The nallah between the Banas and the Mohan yielded two tools, one fresh ovate and one flake.

Chitora[2] 24° 21′, 81° 36′

This small village is situated on the left bank of the above river. Four ESA and eight MSA tools were found from the loose gravel patch.

Kua[3] 24° 24′, 81° 39′

This village is situated 2 Km away from the bank of the above river. Thirteen LSA tools were picked up from the left bank.

Barhai[4] 24° 24′, 81° 42′

It is situated on the left bank of the above river. Eight MSA tools were obtained from the gravel bed. Nineteen LSA tools were picked up from the bank.

Rajghat[5] 24° 24′, 81° 43′

A Kilometre downstream is the village of Rajghat. Here twelve MSA tools were lying in the loose gravel, which were 1/4 Km away from the bed. Five LSA tools were also found from the bank.

Akaori[6] 24° 24′, 81° 44′

This village stands on the right bank of the river Son. Three ESA tools were discovered from the loose gravel bed, while twelve MSA tools were collected from a long

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1. 63 H/11+15
2. *Ibid.*
3. *Ibid.*
4. 63 H/11+15.
5. *Ibid.*
6. *Ibid.*

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patch of small gravel lying nearly one furlong away from the bed of the stream on the left bank.

Margati Hill[1] 24° 25′, 81° 43′

One factory site of LSA was located at Margati Hill near Churhat. One finished tools, five blades and fourteen flakes were collected.

Bargama[2] 24° 25′, 81° 47′

The loose gravel bed at Bargama, which is on the right bank of the Son yielded three ESA and six MSA tools. Seven LSA tools were picked up from the same bank.

Bhelki[3] 24° 27′, 81° 49′

To understand the relationship between the cultures, a small affluent of the Son, called Deonar nadi was followed towards the upstream from the confluence. Just after going ahead, four MSA and six LSA tools made from the water-worn pebbles were found from the right bank of the nadi, opposite to this village. The investigation was carried out for more than three miles, but no section was found.

Sidhi[4] 24° 24′, 81° 55′

This is a town and the headquarters of the Sidhi district. On section on the left bank of Sukha nadi which flows in the west of the town, was observed with the following deposits :—

Black brown soil	—	.15 m
Dark brown sandy silt	—	3.36 m
Cemented pebbly gravel	—	.91 m

No tool could be noticed in the section. Fifteen LSA tools were found from the bank of the stream.

Parnia[5] 24° 24′

Two and half Kilometres away from Sidhi town is Parnia village. One cliff section was marked on the Hiranya nadi, which flows near this village, with the following horizons :—

Black brown soil	—	.90 m
Yellow brown silt	—	1.51 m
Slightly cemented sandy gravel	—	1.51 m
Dark brown sandy silt	—	.60 m
Cemented pebbly gravel	—	1.21 m
Rock bed	—	1.00 m

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1. *Ibid.*
2. 63 H/11+15
3. *Ibid.*
4. *Ibid.*
5. 63 H/11+15

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One big unrolled flake was found *in situ* from the lower gravel. The hand-axes made by cylinder hammer technique and one scraper were picked up along with seven MSA tools from the loose gravels. Two MSA tools were found *in situ* from the second gravel. Twelve LSA tools were found from the bank. (Pl. XIV, Fig. 1)

Gara[1] 24° 27′, 81° 57′

This small village is situated nearly 4 Km to the north of Parnia village. From a *nallah* twenty-seven MSA and six LSA tools were collected. A flake of sandstone is obtained from the bed. It may belong to ESA.

Hill near Nowreha[2] 24° 27′, 81° 56′

From a hill near Nowreha, which is nearly 4 Km in the north of Sidhi town and 1 Km in the west of Gara, one blade and five flakes of LSA were found.

Jhuko[3] 24° 26′, 82° 16′

At Jhuko, which is situated at the foot of the Hill, the river Gopat, a tributary of the Son was explored twice. At the first time, in 1962, one flake of ESA was found from the loose gravel bed. It was thought that this place may provide a good number of tools and therefore, second time in 1963 this place was again examined, but only one MSA tool could be obtained.

However, no further investigations could be carried out in the Gopat valley either in the upstream or in the downstream except at three places (excluding this)—the confluence of this river with the Son and the other two are its tributary Mohan—as this valley is thickly forested.

Deosar[4] 24° 21′, 82° 19′

In the west of Deosar town, two sections on the left bank of the Mohan were noticed. One of them showed the following deposits :—

Black brown soil	—	0.70 m
Dark brown silt	—	7.60 m
Cemented pebbly gravel	—	0.60 m
Rock bed	—	1.50 m

The other section had the similar horizons with the following measurements :—

Black brown soil	—	0.80 m
Dark brown silt	—	6.10 m
Cemented pebbly gravel	—	1.50 m
Rock bed	—	1.20 m

A chopper was discovered *in situ* in one of the sections.

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1. *Ibid.*
2. 63 H/11+15
3. 63 L/3+7
4. 63 L/3+7

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Majona[1] 24° 17′, 82° 21′

Further is the south of Deosar town, the investigation was made at Majona, which is situated four Km south of Deosar town on the right bank of the above nadi. One cliff section on this bank with the following deposits was noticed :—

Black brown soil	—	0.60 m
Dark brown sandy silt	—	2.43 m
Cemented pebbly gravel	—	1.83 m

One ESA flake was taken out from the gravel. Eight LSA tools were picked up from this bank.

The region is forested and therefore no further work was possible. (Pl. XV, Fig. 2)

Jogdah Bridge[2] 24° 30′, 82° 10′

This bridge is constructed on the river Son and on the road running from Hanumanah to Deosar. On the right bank on the river one cliff section with the following horizons was noticed. (Pl. VI, XIV, Flg. 2)

Black brown soil	—	.80 m
Yellow brown silt	—	7.92 m
Sandy gravel	—	0.45 m
Dark brown sandy silt	—	0.60 m
Rock bed	—	2.30 m

The sandy gravel yielded nine MSA tools. Three loose tools of the same age were also collected from the bed. Seven LSA tools were collected from the surface of the bank.

Hill near Jogdah Bridge[3] 24° 30′, 82° 10′

From the hill, which is on the left side of Jogdah Bridge, five finished MSA and nine LSA tools were picked up. LSA tools are slightly fresh than MSA tools.

Ramnagar[4] 24° 32′, 82° 12′

This village is situated on the left bank of the Son. Here in a gully a cliff section with the following horizons was marked :—

Black brown soil	—	0.70 m
Yellow brown silt	—	5.79 m
Sandy pebbly gravel	—	1.21 m
Dark brown sandy silt	—	0.45 m
Cemented bouldery and pebbly gravel	—	2.74 m

Three MSA tools were discovered *in situ* from the sandy gravel. The loose gravel bed

1. 63 L/3+7
2. 63 L/2+6
3. 63L/2+6
4. *Ibid.*

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lying at this side of the bed yielded seven ESA and eighteen MSA tools. Two LSA tools were found from the bank. (Pl. XV, Fig. 1)

Hinoti[1] 24° 34', 32° 13'

A noted LSA factory site was located on a hill, which is near Hinoti village three Km away from the Son. From an area of 7 m ×7 m two hundred nine microliths were picked up. The types represented are scrapers, points, blades and fluted cores etc Some flake and points measure up to 6.6 cms. But they seem to be associated with the microlithic industry. (Pl. VII)

Nakjhur[2] 24° 32', 82° 15'

This small village is situated on the right bank of Son. Two ESA tools were discovered from a small patch which was lying near this village.

Babboori[3]

From the bed of an affluent, which cuts the deposit madeon left bank of the Son, two ESA and ten MSA tools were found.

Seventy LSA tools were collected from a hill which is in the south of this village.

Sihawal[4] 24° 34', 82° 17'

The most noted site in the Sidhi District was discovered at Sihawal, which is the headquarters of the 'Block'. From here, twenty-five ESA, fifty-five MSA and twenty-six microliths were found from the left bank of the Son. Most of ESA and MSA tools are fresh. ESA tools were made out of the boulders and irregular lumps. For MSA and LSA tools, the river pebbles were used. MSA cores and chips are lying there in hundreds. The place appeared as the factory site. It seems that this bank was occupied by the peoples of all the cultures.

Baghor[5]

This village is situated on the left bank of the Son. From the loose gravel bed thirteen ESA and twenty-nine MSA tools were collected. Five LSA tools were found from this bank.

Laowar[6] 24° 32'. 82° 23'

This small village is situated on the right bank of the above river. Two ESA and one MSA tools were found from a small patch of the loose gravel.

Burdi[7] 24° 32', 82° 24'

This village is situated on the right bank of the Gopat where it merges in the Son. Two ESA tools were obtained from the bed.

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1. 63 L/2+6
2. *Ibid.*
3. *Ibid.*
4. 63 L/2+6
5. *Ibid.*
6. *Ibid.*
7. 63 L/2+6

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Khairpur[1]

This small village stands on the left cliff of the Son. One ESA and nine MSA tools were collected from a small patch of gravel lying in the bed. Eight LSA tools were picked up from the bank.

Beeche[2] 24° 33′, 82° 33′

Nearly 8 km down to Khairpur is situated Beeche on the same cliff. From here, fourteen MSA and five LSA tools were collected.

From a hill, which stands in the north, just near this village, a discoid was found.

Khaira[3] 24° 32′, 82° 33′

It is situated on the right bank of the Son. Three MSA tools with nine LSA tools were discovered from here.

1. *Ibid.*
2. *Ibid.*
3. *Ibid.*

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4

Stratigraphy, Probable Climatic Phases and Dating

No palaeontological evidence is yet available from the Son Valley to date the various archaeological horizons. However, the river deposits of a few regions in Peninsular India have been dated on palaeontological, geological and archaeological grounds Hence against the background of this availab'e evidence an attempt is made here to work out a chronology of the Stone Age industries and the climatic phases associated with them in the Upper Son Valley.

STRATIGRAPHY

The river Son, which is a parabolic in nature—steep near the source and expanding its bed towards the mouth—exhibits the pleistocene deposits at Navatola, Salamtola. Bakahi, Ruhanian and Ramnagar—only the latter yields two gravels. Evidently the Pleistocene deposits in this river have been buried under the huge deposits of sands. In Sidhi District, the artifacts come from the loose gravel patches lying on the sand-bed of the stream which are the result of the present aggradation.

That the river is very ancient is proved by the following geomorphological evidences. Near Devalond (24° 12′, 81° 20′), it twice crosses to a prominent ridge of quartzite and the fact is that it had determined its course prior to the existence of this ridge. The east to west course of the Son was established before the formation of the Kaimur scarps when the relief was low and the river flowed over the shales of the soft Lower Vindhyan.[1]

However, these evidences of the mainstream were meagre and insufficient to place the various cultures in the proper context and hence the exploration was also carried out in some of its tributaries.

The sequence of various deposits as seen in the river Son and its tributaries is described in the following paragraphs.

SON

The Son rises in the unclassified crystalline archaean formations and after flowing for about 5 Km in the archaean terrain, it flows through Lower Gondwana formations for

1. Philip Lake, 1959, *Physical Geography*, Edition for India, p. 353.

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about 100 Km. However, at places it cuts through the trappean outliers during its journey through Lower Gondwana formations. Because of the presence of softer rocks in this part the coarser bouldery and pebbly gravels are not seen in the various cliff sections. And, therefore, at Navatola and Slamtola which occur in the Lower Gondwana, the bottom of the cliff is composed of highly compact Kankars mixed with a few pebbles of quartzite etc. and capped by dark brown sandy silt. The latter is followed by black brown soil. The lower deposit yielded eleven ESA tools.

After Slamtola, the river was examined at various places. There the banks are composed of yellow brown silt and the river bed is mostly of sands.

At Bakshi and Ruhanian, the sandy gravel patch rests on the rock and is in turn followed by the yellow brown silt and black brown soil, respectively. LSA tools were picked up from the surface of the back brown soil.

After Markandey the river starts flowing through Upper Vindhyan formations and naturally because of the change in the bed rock lithology bouldery and pebbly material is commonly seen in the bed of the river.

In the downstream near Jogdah Bridge, dark brown sandy silt lies over the rock bed and is capped by the sandy gravels, which yielded MSA tools. It is followed by yellow brown silt and black brown soil. LSA tools were obtained from the top of the black brown soil.

At Ramnagar in a rain gully, the cliff-section at the bottom has cemented bouldery and pebbly gravel and is overlain by dark brown sandy silt. It is followed by sandy pebbly gravel and sandy yellow brown silt. On the top is black brown soil. No *in situ* tool could be found in the lower gravel. Three MSA tools were discovered *in situ* from the second gravel which is less cemented than the previous one. Two LSA tools were picked up from the surface of the black brown soil.

KATNI

On the Kanti nadi at Murwara, a well cemented bouldery and pebbly gravel is exposed in the bed of the river and also is the cliff section. It is overlain by highly Kankarized silt. The latter deposit is followed by the yellow brown silt and black soil. Seven tools were extracted from the cemented gravel.

The lower cemented gravel and its overlying Kankary silt probably represent the period I of the Pleistocene period, while the yellow brown silt which caps the Kankarized silt may belong to Period II of the Pleistocene period. No MSA tools could be found either in in the Pleistocene deposits or in the modern bed materials of the stream.

JHEPAWAN

The section on the left bank of River Jhepawan near Banjari shows cemented bouldery and pebbly gravel to be resting on a rock. The gravel is further capped by dark brown silt which is followed by black brown soil. In the gravel layer five ESA tools were found *in situ.*

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HIRANYA

On the left bank of this nadi, near Parnia village a section consisted of a well cemented pebbly gravel and followed by dark brown sandy silt. The latter is capped by fairly consolidated sandy gravel which is further overlain by yellow brown silt. On the top is black brown soil. One flake, 160 mm in length made on chert, was removed from the pebbly gravel while the overlying sandy gravel yielded two MSA tools made on chert. Two hand-axes made on chert were found in the loose gravel lying in the bed of the stream.

LSA tools were found from the surface of the black brown.

SUKHA

The section on the left bank of this river near Sidhi town only had the deposits of one period, viz. cemented pebbly gravel and dark brown silt. On the top is black brown soil. No Stone Age tools could be recovered from the gravel. LSA implements were found from the surface of the black brown soil.

MOHAN

On this stream three sections were located : two of them at Deosar and one at Majona. All the three sections show from bottom upwards : cemented pebbly gravel, dark brown silt and black brown soil. One chopper, and one flake were found *in situ* in the gravel at Deosar and Majona respectively. LSA tools were found from the top of the black brown soil at Majona.

JOHILLA

In the cliff-section of this river between Gorai and Barachanda, slightly cemented bouldery—pebbly gravel rests uncomformably on the Gondwana sandstone. It mainly consists of trap, a few chert and granitic components. This deposits is overlain by sandy brown calcareous silt which is again capped by thick deposit of slightly cemented pebbly sandy gravel—which in composition and texture does not differ much from gravel I. At places it is more sandy and shows cross-bedding. Both the gravels yield MSA tools made on chert. However, one chopping–tool of chert was also found *in situ* in gravel I. Seven ESA tools made on chert and breccia were collected from the loose gravel bed of the stream within a distance of about 3 miles downstream from this section. LSA tools were picked up from the fields. The overlying silt of gravel II is thick, sandy and calcareous. The intervening silt between gravel I and gravel II does not appear to form a continuous deposit for a considerable distance, instead it thins down within a distance of about 1 Km.

From the archaeological as well as geological evidences, it appears that the gravels I and II observed in the section are the result of one aggradational phase with slight change in the sedimentation process as represented by intervening silt.

This unusual thick deposition might have occurred because of the sudden drop in the gradient of a river and its feeding tributaries and also because of some obstruction in the

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about 100 Km. However, at places it cuts through the trappean outliers during its journey through Lower Gondwana formations. Because of the presence of softer rocks in this part the coarser bouldery and pebbly gravels are not seen in the various cliff sections. And, therefore, at Navatola and Slamtola which occur in the Lower Gondwana, the bottom of the cliff is composed of highly compact Kankars mixed with a few pebbles of quartzite etc. and capped by dark brown sandy silt. The latter is followed by black brown soil. The lower deposit yielded eleven ESA tools.

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LSA tools were found from the surface of the black brown.

SUKHA

The section on the left bank of this river near Sidhi town only had the deposits of one period, viz. cemented pebbly gravel and dark brown silt. On the top is black brown soil. No Stone Age tools could be recovered from the gravel. LSA implements were found from the surface of the black brown soil.

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form of hard rock barrier which prevented the main stream in carrying its load further downstream. The sandy and silty layers in this gravel deposit mostly indicate channel changes due to braiding and meandering processes.

SUMMARY

The above observations reveal that the deposition of two gravels in the Upper Son Valley is seen only at Ramnagar (Son) and Parnia (Hiranya). ESA tools could not be found from the basal gravel of Ramnagar and a big flake af chert removed from the lower gravel of Parnia does not provide much support for the existence of ESA industry in that deposit. However, these lower gravels may be equated with the well cemented gravel of Murna (Katni), Deosar, Majona (Mohan) and Banjari (Jhepawan) yielding only ESA tools.

Thus the two periods of aggradation may be noticed in the pleistocene deposits of the Upper Son Valley. The ESA bearing gravel is generally bouldery and pebbly in nature and rests uncomformably on the solid rock. It is sometimes capped by sandy dark brown silt. This silt is further capped by MSA bearing sandy gravel which is again overlaid by brownish yellow silt.

LSA tools were lying at many places on the top of the black brown soil. It may be also pointed out here that a microlithic industry also had its extension on the lower hills.

CLIMATE

The Upper Son receives on an average about 50″ of annual rainfall and is fairly covered with been decidurous forest. Tectonically, the region is stable and probably it was so even during the Pleistocene times. The behaviour of the Son is directly not affected by eustatic changes of the Pleistocene. And hence the changes in the nature of the texture of the Pleistocene sediments appear to have occurred mainly because of the climatic changes in the Pleistocene.

The climate in general must have been of the present character, i.e. sub tropical monsoonic. However, the extensive glaciation in the higher latitudes and also in the Himalayas might have affected the atmospheric circulatory patterns, the rate of evaporation of the sea water etc. and hence this part peninsular India might have experienced different types of climate during the Pleistocene. There might have been wetter monsoons and drier monsoons probably corresponding with glacial, interglacial fluctuations of the higher latitudes. Whether the changes in the higher and lower latitudes were homotaxical or not, is very difficult to assess in our present state of knowledge of the Pleistocene climate.

Hypothetically, we may assume that the wet period in the Upper Son was slightly than the present one and the dry one was much drier than the present one. Both the periods were probably of sufficient duration and intensity so as to affect vegetation and geomorphic processes significantly.

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During the wet period, the vegetation cover in the valley probably might have been quite thick as to reduce the surface run off of rain water and also soil stripping. The major streams like the Son were flowing with ample water with increased competence and capacity which enabled them to transport cobbles and pebbles for considerable distances The rapidly flowing turbulent waters with their powerful tools of pebbles and cobbles of hard quartzites could also eat down vertically their own valleys. The vertical incision as well as deposition of coarser material at suitable places in the channel of the streams must be occurring during even monsoon season in the wet phase. But the overall incision was dominant in the peak period of wet phase while overall deposition of cobbly and bouldery gravels probably ensued during the declining period of wet phase when the capacity and competence along with total discharge of the streams were greatly reduced.

In the dry period, the vegetation matt in the valley probably was very sparse and this increased the surface run off and soil stripping. Lot of finer materials like sand and silt came down into the trunk stream through ill-defined drainage during occasional stormy rains. The competence of the streams was less and the general tendency was more towards aggradation and hence there was general alluviation in the valley both in the main streams and its tributaries—during occasional stormy rains of the dry monsoons.

There were probably two wet phases and two dry phases in the Pleistocene period. In the wet phase, coarse cobbly and pebbly gravels, along with ESA tools were laid down over highly contorted rocky bed. It was followed by a dry phase in which river alluviated its valley with finer sand and silt in which no Stone Age Tools were found.

The second wet phase was probably less intense than the first one and the incision of the earlier alluvium was not very strong and the gravels deposited over the earlier silt in the declining stages of the wet phase were much finer in texture and contain MSA tools.

In the second dry phase the rivers aggraded their beds to the height of about 50′ from the present water level with very fine silt.

Probably the present climatic phase ensued at the beginning of the Holocene period, the early part of which was much humid. The country got covered with good vegetation and the silt of the second dry phase weathered into black brown soil. The LSA tools occur on the surface of this soil.

DATING

In the peninsular part of India, ESA tools are found along with the Middle Pleistocene fossil fauna, hence they are dated to the Middle Pleistocene.[1] The assemblage includes

1. Sankalia, H.D; Deo, S.B. ; Ansari, Z.D. and Erhardt, S., 1960, From History to Pre-History at Nevasa, pp. 75-6 ; De Terra, H. and Paterson, 1939, Studies on the Ice Age and Associated Human Cultures, pp. 313-26.

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well trimmed handaxes and cleavers along with crudely trimmed specimens and pebble tools This industry, following the principle of archaeological dating that 'an assemblage' should be dated by the most advanced tools rather than by more numerous primitive tools, can be attributed to the level where Acheulian handaxes appeared by the introduction of a new technique—'cylinder hammer'. The well made Acheulian handaxes along with cleavers having a biconvex cross-section and not a parallelogram appeared in East Africa at Olduvai Gorge in Stage VII found from the base of Bed IV. The cleavers with parallelogramatic cross-section come there in Stage VIII.[1] The ESA industry of India which consists of cleavers suggests "the direct spread of Acheulian tradition from Africa into India."[2] The cleavers of parallelogrammatic cross-section indicate that ESA culture in India entered at the Stage VIII of the Olduvai Gorge. The Bed IV of the Olduvai Gorge is dated to the upper part of the Middle Pleistocene.[3] Hence it might be held that in India the ESA culture came in the upper part of the Middle Pleistocene or after that. Wainwright,[4] who adopted the method of beginning with modern deposits and working back into the past has dated the Acheulian tool bearing ESA gravel of Lower Narmada in Gujarat to the last Inter-Glacial. Again, in the Potwar region the first assemblage of handaxes is dated to the late Middle Pleistocene[5] Thus it seems more factual that the ESA culture in peninsular India entered in the late or upper Middle Pleistocene or even at the end.

The occurrence of Abbevillian handaxes and pebble tools along with fine Acheulian handaxes suggest the survival of the old elements and techniques along with evolved technique.

MSA tools are also found in association with the Middle Pleistocene fossil fauna from the second gravel of the Godavari[6] and the Narmada.[7] However, it is likely that the fossil fauna of this gravel was late survival and, therefore, it must be attributed to the upper Pleistocene, or according to our method of calculation late in the upper Pleistocene. This industry might have evolved from the earlier culture.

LSA tools come from the surface of the river banks and the hills. They may belong to Holocene because of their association with black soil.

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1. Leakey, L.B.S., 1951, Olduvai Gorge, pp. 106, 117-120.
2. Oakley, K., 1964, Frameworks for Dating Fossil Man, p. 224.
3. Leakey, L.B.S., 1965, Olduvai Gorge, 1951-61, Vol. I, p. 43.
4. Wainwright, G.J., 1964, The Pleistocene Deposits of the Lower Narmada River and An Early Stone Age Industry from the River Chambal, pp. 44-45.
5. Paterson, T.T. and Dhrammond. H.J.H., 1962, Soan the Palaeolithic of Pakistan, p. 95.
6. Sankalia and others, op. cit., 1960, p. 105.
7. IAR, 1958-59, p. 27.

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Chronology of the Upper Son Valley

Holocene	Period III	Phase V	Present Climate	Black brown soil. LSA
Upper Pleistocene	Period II	Phase IV	Dry	Yellow brown silt. Unimplementiferous.
		Phase III	Wet	Sandy gravel, at places pebbly. MSA
Upper-Middle Pleistocene	Period I	Phase II	Dry	Dark brown sandy silt ; at one place it is not sandy. Unimplementiferous.
		Phase I	Wet	Bouldery, pebbly gravel, sometimes sandy and kankary. ESA

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5

Terminology

The idea of coining terms for Indian Prehistory was expressed twenty years ago by Sen—"Many workers in the field have taken after the European nomenclature. I think it should be better if we evolve Indian nomenclatures for the cultures and use local names to avoid confusion."[1] Again, after some years Subbarao feeling the need to have simple and well fitted terminology for Indian Pre-History, wrote that "the European terminology is being adopted and adapted. Remembering that things which may have the same name in Prehistory are not necessarily the same in time or content, we may try to avoid the pitfalls into which European and African developments have landed" and, therefore, he held "the classic tradition, either of Europe or Africa, should not intrude in India." He divided the entire Stone period (excluding Neolithic) into three ages, Early, Middle and Late.[2]

In 1960, Mohapatra put forward some more objections to the use of the European terminology.

i) In India, the sufficient geological and palaeontological evidences are not found and therefore it is difficult to establish a manifest chronological picture of the Pleistocene.

ii) The Indian Middle Palaeolithic culture possesses an inadequate amount of typetechnological identity with the European or African parallel cultures.

iii) For the Upper Palaeolithic culture, in India, unlike Europe, no definite evidence in brought forward. A few blades and burins are assigned to this cultural phase, "but their typological and stratigraphic position is not at all free from serious doubts and controversies." Unless they come from a clear stratified deposits from many parts of India and in appreciable number, a separate culture cannot be postulated.

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1. Sen, D., 1944, "Discussion—Corrleation of Stone Age Cultures in India." 31st Session, PISC, Pt, IV, p. 38.
2. Subbarao, B., 1958, The Personality of India, p. 38.

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iv) "Many Indian prehistorians have used these European terminologies which have not only obscured the real character of the Indian lithic industries but also has led us into rash correlations and irrelevant conclusions."

With these views in mind, the First International Conference on Asian Archaeology held in Delhi in 1960 recommended to use the terminology suggested by Subbarao. Hence in the dissertation these terms are adopted.

1. Subbarao, op. cit., p. 39.
2. Ibid., pp. 39-40.
3. Mohapatra, G.C., The Stone Age Cultures of Orissa, 1962, p. 59.

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6

Cultures

Out of sixty-five sites, ESA relics were obtained from thirty-five sites. The total number of ESA artifacts recovered from the Son basin is one hundred and sixty-seven. The collection include choppers, chopping-tools, discoids, scrapers, hand-axes, cleavers and flakes. No definite cultural evolution can be seen since the stratigraphical evidence is limited. Only twenty-six artifacts, devoid of MSA tools, were found in the First Gravel of the river sections. Besides, one chopping-tool made of chert along with two MSA tools were obtained from the bottom of the cliff section of the river Johilla at Barachanda. This chopping-tool is probably a re-deposit. The rest of the tools came from the loose gravels. The tools found *in situ* do not provide much evidence in this connection. Though many of the tools are patinated, a classification on that basis also does not reveal any significant features.

From two sites, namely Sihawal and Basari Hill, the artifacts of ESA were picked up along with the MSA and the LSA. The tools of these places are classified on the basis of size and types.

Near the source of the Son, eleven *in situ* tools were removed from the bottom layer of the cliff sections at Nawatola and Slamtola. No MSA tool was found from those places. Out of eleven tools, one flake is of quartz, four tools of fine grained quartzite. Here the river flows through the Lower Gondwana formations. It is quite probable that ESA man might have utilized some of the quartzite pebbles derived from Lower Gondwana conglomerates occurring in that area.

After the above places, ESA tools made mainly on quartzite (none of them on fine grained) were obtained at Bicharpur from the bed of a tributary of the river Son, namely Tipan. Again from the vicinity of Anuppur and Samatpur, three tools of chert (APR-1 ; SPR-1 and 2) were picked up. At Hirha where the river Son flows through the outcrops of the Deccan trap, four rolled ESA tools from a junction of a small *nallah* were found. One of them is of dolerite and the rest three are of quartzite which seems to have been brought by that *nallah* from upper reaches. One flake obtained from Harhi is of chert.

No artifact of ESA could be discovered from the bed of the mainstream between Slamtola and Markandey, where the river meets the Kaimur scarp of the Vindhyan and takes a turn to the east. ESA relics are also not found from its tributaries between Harhi and Barachanda.

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From Markandeya to Khaira, most of the tools are made on coarse grained quartzite and the rest on chert. The use of chert by ESA man can be perhaps explained by its easy availability.

For the ESA tools of Basara and Suddi, the coarse grained sandstone is used. The tools of Bhadora and Banjari are made of quartzite. The artifacts from Murwara are manufactured from coarse and medium grained sandstone.

The sites on the river Johilla yield tools of chert only. One tools from Barachanda is made of breccia. This stream in its upper reaches flows through the Deccan trap and therefore the non-availability of quartzite in this area led ESA man to utilize chert.

The following are the percentages of various rocks :—

Quartzite	...	93	...	55.7 %
Quartz	...	1	...	.6 %
Sandstone	...	15	...	9.0 %
Porcellanite	...	3	...	1.8 %
Dolerite	...	2	...	1.2 %
Breccia	...	1	...	.6 %
Chert	...	52	...	31.1 %

Tools are fresh or unrolled. Six specimens are encrusted with clay or hard calcareous materials. Seventeen artifacts are heavily patinated. Implements obtained *in situ* from the gravel layer are rolled as well as unrolled.

The following are the percentages of the physical condition of the tools :—

Unrolled	...	17	...	10.2 %
Slightly rolled	...	20	...	12.0 %
Rolled	...	94	...	56.3 %
Heavily rolled	...	36	...	21.5 %

The following are the percentages of the different tool types :—

Core Tools		*Flake Tools & Flakes*		*Tatal*	*Percentage*
Tool Types	No.	Tool Types	No.		
Choppers	6	—	—	6	3.6
Chopping-Tools	16	—	—	16	10.0
Discoids	7	—	—	7	4.1
Handaxes	22	Handaxes	12	34	20.3
Ovates	3	Ovates	2	5	3.0
—	—	Cleavers	7	7	4.1
Scrapers	19	Scrapers	13	32	19.0
—	—	Flakes	60	60	35.9
Total	73		94	167	

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The various tool types of this collection are divided into three stages on the following characteristics :—

Stage I	...	Big and deep flake scars
Stage II	...	Big and deep flake scars along with some shallow flake scars
Stage III	...	Shallow and thin flake scars

These stages do not imply any chronological relationship. They might have all flourished contemporaneously.

The following numbers occur in the various stages:—

Stage I	101	...	60.5%
Stage II	36	...	21.5%
Stage III	30	...	18.0%

Choppers occur in the Stage I and chopping-tools in the Stages I and II. Discoids also occur in the first two stages. Ovates come in the Stage III. Three faceted flakes occur in the collection, but none of them can be called 'Levalloisian.' Seven cleavers are recorded. For choppers and chopping-tools mainly flat based pebbles are used.

All the varieties of tool-types are described, but only those indicating different techniques as utilized by ESA man are illustrated.

STAGE I

This stage includes tools which show crude technique. Flake scars are big and deep suggesting the use of 'stone hammer' technique or 'block-on-block' technique. (Pl. VIII, Figs. 1, 2).

The following are the tool-types of this stage :—

A. Choppers	...	6
B. Chopping-tools	...	11
C. Discoids	...	3
D. Scrapers	...	14
E. Handaxes	...	14

A. Choppers.

MRA-27 (*in situ*) Chopper on the elongated oval and flat based pebble of quartzitic sandstone; unrolled ; flaked on the elongated side from the upper surface, edge produced by the intersection of steep flake scars from the upper surface and unflaked flat under surface. Size : 160×110×77[1] (Pls. VIII, Fig. 1 ; XVIII)

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1. All the measurements of the tools are in Millimetres

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B. Chopping-tools

BCA-21 : Chopping tool ; chert ; unrolled ; both the faces are steeply worked, a patch of cortex at either side and on the opposite side of the working edge ; wavy edge.
Size : 110×89×72 (Pls VIII, Fig. 2 ; XIX)

C. Discoid

MRA-20 : A thick discoid ; sandstone ; rolled ; both the faces fully flaked showing steep and big flake sears ; wavy edge along the periphery
Size : 118×105×65 (Pl. XX)

D. Scrapers

They are divided into two groups :

(a)	On cores	...	9
(b)	On flakes	...	5

D. (a) On cores

BGR-3 : Side scraper on a core of chert ; slightly rolled ; both the faces flaked steeply leaving a very thin patch of cortex at either side ; wavy edge : size : 91×55×41 (Pl. XXI, Fig. 1)

D. (b) On flakes

SHL-10 : Side scraper on a flake ; quartzite ; unrolled, patinated ; upper surface flaked at the left margin, showing retouches, the right side shows a deep flake scar, probably for a proper hand-hold, the rest cortex ; the primary flake surface shows retouches at the scraping edge and three shallow flake scars near the butt.
Size : 125×80×38 (Pl. XXI ; Fig. 2)

E. Handaxes

The handaxes can be divided into two groups :—

(a)	On cores	...	7
(b)	On flakes	...	7

E. a. On cores

The specimens, according to the shape, may be divided into following :—

(1)	Almond	...	3
(2)	Pointed	...	2
(3)	Triangular	...	2

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E.a. 1 Almond

MRA-23 (*in situ*) : Almond shaped handaxe on a core of quartzitic sandstone ; rolled; upper surface fully flaked showing large flake scars, under surface flaked at the margins and a ridge at the either side ; rhomboid cross-section.
Size : 126×73×42 (Pl. XXII)

E.a. 2 Pointed

MRA-1 (*in situ*) : Pointed handaxe with a thick side encrusted with clay (which has been removed); upper surface fully flaked showing some bold flake scars and producing a slope to the left side, one big and deep flake is removed from the top for a proper hand-hold ; under-surface including the butt-end shows six flake scars, mainly from the sloping side for a proper hand hold, and a patch of cortex ; projecting point made from the removal of two flakes at either side of the upper surface.
Size : 145×82×52 (Pl. XXIII)

E.a. 3 Triangular

MRA-4 (*in situ*) : Triangular hand-axe on an elongated pebble of quartzite; encrusted originally with clay (which has been now removed excepting the butt-end) ; rolled ; upper surface shows some shallow flake scars and a big patch of cortex, a keel runs from the tip to the butt ; under surface shows some shallow and steep flake scars and a patch of cortex, an insignificant zigzag keel runs from the tip to the butt ; butt retains cortex ; tongue like tip ; rhomboid cross-section.
Size : 153×88×46 mm

E.b On Flakes

This group contains the following shapes :—

(1)	Pear	...	4
(2)	Triangular	...	2
(3)	Pointed parallel sides	...	1

E. b. 1 Pear

BCA-28 : Pear-shaped handaxe on a flake of chert ; rolled ; upper surface flaked by stone hammer showing large and steep flake scars and a ridge ; primary flake surface shows thin flake scars at the margins ; rounded butt ; tongue-like tip ; roughly triangular cross-section.
Size : 125×67×42 (Pl. XXIV, Fig. 1)

E.b. 2 Triangular

BRI-2 : Handaxe on a flake, broken tip ; quartzite ; unrolled ; upper surface fully flaked by bold-flaking ; some thin flake scars on the primary flake surface ; unprepared platform shows two flake scars at the margin ; sharp, slightly wavy edge ; triangular cross-section.

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Size : 95×80×45 (Pl. XXIV, Fig. 2)

E.b. 3 Pointed parallel sided

BSA-5 : Parallel sided handaxe with pointed butt on an oblique flake ; quartzite ; highly rolled ; upper surface shows some shallow and steep flake scars ; the cortex near the tip ; primary flake surface 'clean'. It can also be said as handaxe-cum-cleaver ; plano-convex cross-section.

Size ; 137×89×40

STAGE II

The tools of this stage show big as well as small shallow flake scars. It appears that along with the previous technique-'stone-hammer'-another technique called 'cylinder hammer' technique also characterized this stage. The use of the 'cylinder hammer technique' gave a somewhat symmetrical form to the artifacts.

(Pl. IX, Figs. 1, 2)

This stage contains the following tool-types :—

A.	Chopping tools	...	5
B.	Discoids	...	4
C.	Scrapers	...	11
D.	Handaxes	...	10
E.	Cleavers	...	4

A. Chooping Tools

NTA-2 (*in situ*) : Chopping tool ; fresh ; on a round pebble of quartzite ; a few shallow flake scars removed from the top for a proper hand-hold and three steep flake scars at the side of upper surface ; two patches of cortex ; under surface shows nine shallow and one steep flake scars ; wavy edge produced by the intersection of steep flake scars from the upper surface and the flaked-flat under furface.

Size : 100×95×70 (Pls. IX, Fig. 2 , XXV)

B. Discoids

AOI-3 : Discoid ; quartzite ; unrolled ; upper surface shows some steep flake scars and two patches of cortex, one on the centre and the other on the right periphery, under surface fully flaked ; a wavy edge produced along the periphery by the intersection of the steep flake scars from the upper surface and flaked flat under surface.

Size : 90×80×44 (Pl. XXVI, Fig. 1)

C. Scrapers

The specimens are divided as follows :—

(a)	On cores	...	7
(b)	On flakes	...	4

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C.a On cores

They are further classified into two groups :—

(i)	Side-scrapers	...	6
(ii)	Round-scraper	...	1

C.a.i Side-scrapers

SHL-8 : Pointed side-scraper on a core ; quartzite ; unrolled ; both the faces flaked by 'step' and 'free' techniques ; a patch of cortex at either side.
Size : 95×70×42 (Pl. XXVI, Fig. 2)

C a.ii Round-scraper

PNA-2 : Round ; scraper on a core of chert ; unrolled ; patinated ; a part of it is encrusted with clay ; both the faces are flaked showing shallow and step flake scars , 'step' flaking is also done along the edge to make it sharp.
Size : 82×83×35 (Pl. XXVII, Fig. 1)

C.b. On flakes

All are side scrapers. They may be further divided into :—

(i)	Scraping-edge on one side	...	2
(ii)	Scraping-edge on both sides	...	2

C.b.i Group i

GNI-2 : Side scraper on an end flake of chert ; rolled ; upper surface partly flaked , primary flake surface with a prominent bulb and bulbar scar , retouched on left margin.
Size : 110×70×30 (Pl. XVII, Fig. 2)

C.b.ii Group ii

GJI-2 : Side-scraper on a thick parallel sided flake, having scraping edge on both the sides ; chert ; slightly rolled ; upper surface shows two long-steep and some small flake scars ; a patch of cortex at the tip and a midridge ; retouched from both sides on the margins unprepared wide angled platform ; working edge wavy ; triangular cross-section.
Size : 134×66×39 (Pl. XXVIII)

D. Handaxes

The specimens are classified into two groups :—

(a)	On cores	...	6
(b)	On flakes	...	4

D.a On cores

This group of handaxes contains the following shapes :—

(1)	Almond	...	2
(2)	Pear	...	2
(3)	Triangular	...	1
(4)	Biconical	...	1

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D.a.1 Almond

MRA-19 (*in situ*) : Almond-shaped handaxe ; sandstone ; rolled ; both the faces show shallow and step flake scars and a patch of cortex ; pointed tip ; rounded butt-end ; biconvex cross-section at the tip and rhomboid cross-section at the centre.
Size : 158×85×45 (Pl. XXIX)

D a 2 Pear

STA-2 (*in situ*) : Pear-shaped handaxe on a pebble of fine grained quartzite ; upper surface shows big and shallow flake scars and the under surface, two deep and the rest shallow flake scars ; both faces have a thin patch of cortex ; chisel-like tip ; thick pebble butt ; sharp, slightly wavy working edge ; biconvex cross-section and rhomboid cross-section near the tip and the butt respectively.
Size : 139×79×51 (Pls. IX, Fig. 1 , XXX)

D a.3 Triangular

BDA-2 : Roughly triangular shaped handaxe on a core of quartzite ; slightly rolled ; upper surface shows some shallow big and step flake scars and two tiny patches of cortex , under surface shows some shallow and step flake scars and a patch of cortex, which runs from the tip to the centre ; butt steeply flaked ; rounded tip ; plano-convex cross-section.
Size : 100×55×37

D.a.4 Biconical

BCA-8 : Biconical handaxes on a core of chert ; rolled ; upper surface has two large flake scars, some step flake scars and a ridge , under surface flaked showing shallow and step flake scars ; retouched on the margins ; thick point ; roughly triangular cross-section.
Size : 110×85×36

D b. On flakes

They can be divided into the following shapes :—

(1)	Almond	...	1
(2)	Oval	...	1
(3)	Biconical	...	1
(4)	Pear	...	1

D.b 1 Almond

SHL-21 : Almond-shaped handaxe on a side flake ; slightly rolled ; upper surface shows centrally directed convergent flakes producing a hump in the centre ; under surface clear ; plano-convex cross-section.
Size : 105×70×32 (Pl. XXXI, Fig. 1)

D.b.2 Oval

BCA–2 : Oval-shaped handaxe on a flake ; chert; slightly rolled ; upper surface shows long and shallow flake scars, primary flake surface flaked at the margins ; untrimmed

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butt ; moderately thin tip ; thick margins ; plano-convex cross-section.
Size : 107×66×23 mm. (Pl. XXXI, Fig. 2)

D.b 3 Biconical

GJI-1 : Double pointed handaxe on a flake ; chert ; slightly rolled ; flakes are removed by the step and free flaking methods from the upper surface, leaving a patch of cortex and a hump at the centre , flake surface shows some flake scars near the edges ; one side straight and the other sinuous edge ; triangular cross-section.
Size : 139×88×47 mm (Pl. XXXII)

D.b.4 Pear

BGA-61 : Pear-shaped handaxe on a flake of chert ; rolled ; upper surface shows shallow and step flake scars and a ridge, primary flake surface with a prominent bulb ; some step flake scars are on the margins ; triangular cross-section.
Size : 103×60×27

E. Cleavers

All are made on flakes. Out of four specimens, three are 'U' shaped and one 'V' shaped.

E.1 Group 1

They may be further divided according to the nature of working edge :—

(i) Convex edge	...	1
(ii) Oblique edge	...	2

E.1.i Convex-edge Cleaver

BJI-1 (*in situ*) : 'U' shaped cleaver on a flake ; slightly rolled ; upper surface shows three big flake scars, one of which forms the cleaver-edge ; a few flake scars at the butt ; primary flake surface flaked along the margin, showing step and shallow scars ; convex edge ; triangular cross section.
Size : 104×74×31 (Pl. XXXIII, Fig. 1)

F.1 ii Oblique-edge Cleaver

SHL-6 : 'U' shaped cleaver with oblique edge on a flake of procellanite ; rolled ; upper surface has one large flake scar which forms working edge and some shallow and step flake scars on the left part, right side retains cortex , primary flake surface shows some thin flake scars ; use-marks on the working edge, rounded butt, triangular cross-section.
Size : 113×80×25

E 2 Group 2

BSI-3 : Roughly 'V' shaped cleaver on a flake ; quartz ; slightly rolled ; upper surface shows some shallow flake scars, mainly on the margins, a big plain area at the working edge ; primary flake surface shows a few flake scars ; oblique-cutting edge ; pointed butt ; plano-convex cross-section.
Size : 109×79×35 (Pl. XXXIII, Fig. 2)

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STAGE III

The tools of this stage have small and thin flake scars on their surfaces and exhibit perfection in all aspects. They are characterized by a great use of 'cylinder hammer' technique (Pl. X, Figs. 1, 2)

The following tool-types occur in this stage :—

A.	Handaxes	...	10
B.	Ovates	...	5
C.	Cleavers	...	3
D.	Scrapers	...	7

A. Handaxes

They can be divided as follows :—

a)	On cores	...	9
b)	On flakes	...	1

A.a On cores

The specimens are of following shapes :—

1)	Almond	...	1
2)	Pear	...	2
3)	Triangular	...	2
4)	Pointed Parallelsided	...	1
5)	Elongated oval	...	2
6)	Lanceolate	...	1

A.a.1 Almond

PNA-4 : Almond-shaped handaxes on a core of chert ; rolled; patinated and encrusted with the red silt; fully flaked on both the sides by 'cylinder hammer' technique showing shallow small and step flake scars and subsequent retouches along the edge ; insignificant zigzag ridge runs either side; rhomboid cross-section. Sixe : 13 × 78 × 40 (Pl. XXXIV Fig. 1)

A.a.2 Pear

Of the two specimens, one is small.

A.a 2.I Group

MRA-18 (*in situ*) : Pear-shapedhandaxe; sandstone; rolled; both the faces are flaked by cylinder hammer, upper surface has zigzag ridge and the cementing material on the right side, under surface retains a patch of cortex in the centre; pointed tip ; rounded butt end ; sharp edge along the periphery; rhomboid cross section.

Size : 121 × 75 × 40 (Pl. XXXV, Fig. 1)

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A.a 2.2 Group 2

MRA-4: Small pear-shaped handaxe on a core; quartzite ; fresh ; upper surface shows a few free and step flake scars and a patch of cortex in the centre; under surface fully flaked; chisel like tip; rounded butt; irregular cross-sections.
Size : 68×52×25 (Pl. XXXIV, Fig. 2)

A.a.3 Triangular.

SHL-52 : Triangular handaxe on a core of chert ; rolled and patinated ; both the faces are flaked showing small and step flake scars leaving the cortex at the butt-end ; step flakes are removed along the margin to make sharp edge; broad tip ; biconvex cross-section.
Size : 93×70×29 (pl. XXXV, Fig. 2)

A.a 4 Pointed parallel sided

SHL-3 ; A pointed paralled sided handaxe on core ; quartzite ; unrolled ; some shallow and step flake scars removed by cylinder hammer and a patch of cortex at either side; biconvex cross-section.
Size : 126×92×30

A.a.5 Elongated Oval

PAN-10 : Oval shaped handaxe; chert; slightly rolled and patinated; both the faces show the small and shallow flake scars, removed by cylinder hammer technique; upper face is domeshaped as the flakes are directed to the centre on a little height ; thin step flakes are removed along the margin to make the edge sharp ; sharp edge along all the periphery: near the tip flakes are removed to produce nothces; rounded butt; biconvex cross section. It is possible that this handaxe was hafted before use.
Size : 129×79×35 (Pls. X, Fig.1; XXXVI)

A a 6 Lanceolate

NA-4 (*in situ*) : Spear shaped handaxe; fine grained quartzite, fresh ; fully flaked on both faces by detaching shallow flakes by cylinder hammer technique ; some stepped flake scars, specially from the edges are also removed producing a wavy edge running all round the way including the butt ; biconvex cross-section.
Size : 130×68×35 (Pl. XXXVII)

A.b On Flake

Only one specimen occurs in this group.

MKY (11)-2 : Roughly triangular handaxe on a flake ; quartzite ; rolled ; upper surface shows some shallow and step flake scars and a tiny patch of cortex, under surface (primary flake surface) 'clean', the platform and the bulb removed by a few flakes ; sharp thin tip ; broad, untrimmed, slightly rounden butt ; plano-convex cross-section at the tip and the butt ; roughly biconvex cross-section at the centre.
Size ; 143×96×29 (Pl. XXXVIII)

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B. Ovates

They can be divided as follows :—

a) On cores ... 3

b) On flakes ... 2

B.a On cores

BBI (II)-1 : Ovate on core ; upper surface flaked at the margin showing small and shallow flake scars; retains cortex at the centre, under surface fully flaked; sharp edge around; roughly biconvex cross-section.

Size : 91×70×27 (Pl. XXXIX, Fig. 1)

B b On flakes

BSA (11) 3 : Ovate on a thick flake; quartzite; unrolled; upper surface shows some step and a few shallow flake scars and a patch of cortex, primary flake surface shows a few shallow and step flake scars ; biconvex cross-section

Size : 17×8×41 (Pl. XXXIX, Fig. 2)

C. Cleavers

All the three are of 'U' shaped and made on flakes. Out of them two specimens have convex edge and one straight edge.

C i Convex-edge cleaver

AOI-2 : Cleaver with oblique-convex edge and 'U' shaped butt an a flake. Quartzite ; unrolled : both the faces flaked at a side and the butt as they were thick; the upper surface retains a plain patch of cortex extended from the cutting edge to near the butt; primary flake surface shows a ridge which runs from the corner of the butt to the corner of the cutting edge ; roughly biconvex cross-section.

Size : 115×76×40 (Pls. X, Fig. 2 ; XL, Fig. 1)

C. ii Straight-edge cleaver

SHL-9 : 'U' shaped clear with straight edge on a flake of quartzite ; the right side of the butt broken ; unrolled ; upper surface fully flaked ; under surface flaked at the left margin ; the working edge shows use-marks ; parallelogramatic cross-section.

Size : 121×74×40

D. Scrapers

They may be classified as follows :—

a) On cores ... 3

b) On flakes ... 4

D.a On cores

Out of the three specimens, two are side-scrapers and one round-scraper.

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D.a.I Side-scraper

They may be further divided into two groups :—

i) Having scraping edge on one side ... 1

ii) Having scraping edge on both sides ... 1

D a I.i Group i

RNR-4 : Disc-shaped side-scraper; chert; slightly rolled; upper surface only flaked ; showing convergent centrally directed flakes at a little height ; a wavy edge produced by the inter-section of steep flake scar from the upper surface with the unflaked under surface.
Size : 73×82×27 (Pl. XL, Fig. 2)

D a I.ii. Group ii

SHL-7 : Double sided scraper on flat core of chert ; rolled; upper surface fully flaked ; under surface shows flake scars on the margins.
Size : 97×63×30 (Pl. XLI, Fig. 1)

D a II Round scraper

SHL-179 : Round-scraper on a core; quartzite, unrolled; upper surface shows convergent centrally directed flakes, under surface a few shallow and step flake scars.
Size : 74×67×30 (Pl. XLI, Fig 2)

D b. On flakes

All are side-scrapers. According to the nature of working edge, these may be further divided into two groups :—

(i) Having scraping edge on one side ... 2

(ii) Having scraping edge on both sides ... 2

D.b.i Group i

GTA-4 : Side-scraper on a side flake; chert; slightly rolled and patinated; upper surface flaked along the margin ; the centre retains cortex; primary flake surface clean.
Size : 81×60×22 (Pl. XLII, Fig 1)

D b ii Group ii

BSI-12 : Double-sided scraper on an end flake of sandstone; weathered; upper surface flaked leaving a patch of cortex in the centre ; primary flake surface flaked at the margins including platform.

Size : 70×83×33

FLAKES

There are sixty flakes. They may be classified into three stages like the regular tool-type.

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The following numbers occur in the various stages :—

Stage I	...	53
Stage II	...	2
Stage III	...	5

The faceted platform flakes appear only in the last stage.

STAGE I

The flakes are removed by 'block-on-block' or 'anvil' technique either from the boulders or pebbles. They are very crude and have an unprepared wide-angled platform varying from 110° to 140°. None of them is fully flaked. The upper surface of three of them are completely cortexed. Fifty-one specimens occur in this stage. According to the nature of striking platform, these flakes can be divided as follows :—

A. End flakes	...	33
B. Side flakes	...	11
C. Oblique flakes	...	9

A. End flakes

Out of thirty-three, eighteen are big and the rest small.

A.1 Group 1

HHI-1 : End thick flake of chert ; fresh ; upper surface shows a few long, deep, small and step flake scars and a patch of cortex opposite to the working edge ; primary flake surface shows two big flake scars at a corner and a bulbar scar ; slightly wavy edge.
Size : 106×93×41 mm. (Pl. XLIII)

A.2 Group 2

STA-4 (*in situ*) : Oval shaped small flake; quartzite; unrolled; upper surface boldly flaked at the left side and partly at the right side, the rest cortex ; primary flake surface makes an angle of 120° with the platform.

Size : 82×62×30 mm.

B. Side flakes

Among eleven specimens four are big and the rest small.

B.1 Group 1

LWR-2 : A side flake ; quartzite ; rolled ; upper surface flaked along the margin; the centre retains cortex.

Size : 127×90×34

B.2 Group 2

RNR-5 : Small side flake ; dolerite ; rolled ; upper surface shows one big and some small flake scars, patches of cortex near the tip and butt; primary flake surface with a bulbar scar,

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Size : 89×65×25 (Pl. XLII, Fig. 2)

C. Oblique flakes

Of nine specimens, five are big and four are small.

C.1 Group 1

MRA-2 : Rectangular oblique thick flake of quartzite; slightly rolled; sides marked by steep flake-scars ; primary flake surface with a prominent bulb.

Size : 139×121×51 (Pl. XLIV)

C.2 Group 2

GRA-1 : An oblique flake ; sandstone ; unrolled ; upper surface shows two step flake scars at the tip and two at the butt ; primary flake surface make in angle of 120° with the prepared platform.

Size : 95×89×26

STAGE II

Out of the two flakes, one is fully flaked on the upper surface. The second is partly flaked, but shows shallow flake scars.

SHL-12 : A thick end flake ; unrolled ; upper surface shows deep and steep flake scars and two patches of cortex, one at the left longer axis and the other at the tip ; primary flake surface has a bulbar scar.

Size : 109×98×40 (Pl. XLV)

STAGE III

The flakes of this stage may be divided into two groups : —

A. Simple flakes ... 2

B. Faceted platform flakes ... 3

The simple flakes of this stage exhibit some distinctive features. Out of two, the platform of one has been flaked. The platform of the other makes an angle of 125°. But both of them on the upper surface are fully flaked by 'cylinder hammer' showing shallow flake scars.

These flakes may be further classified as :—

(a) End flake ... 1

(b) Indeterminate flake ... 1

A.a. End flake

MJA-1 : Point-shaped flake ; quartzite ; unrolled ; flaked all over the body ; primary flake surface shows one step flake scar at the left side near the tip and a few steep flake scars at the right side.

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Size : 107×82×29 (Pl. XLVI, Fig. 1)

A b Indeterminate flake

BSI-13 : Small flake ; sandstone ; unrolled ; weathered ; upper surface shows centrally directed convergent flake scars.

Size : 89×65×25

B. Faceted platform flakes

The collection yields flakes with three-faceted platform. As much work on the upper surface before detaching them from the core was not done, the author does not prefer to call them 'Levalloisian' flakes or 'prepared-core' flakes.

LWR-1 : Faceted platform flake ; chert ; rolled and patinated ; upper surface has a big flake scar on the left and cortex on the right ; primary flake surface shows three thin flake scars at the margin ; prepared platform.

Size : 80×74×37 (Pl. XLVI, Fig. 2)

UNCLASSIFIED ARTIFACTS

Some tools which have been either badly weathered or have three or four flake scars on their surfaces with no regular shapes are not catalogued in the known tool-types of this industry. A few massive flakes and chips are also in this group.

MIDDLE STONE AGE CULTURE

Four hundred and eighty-five MSA artifacts were collected from forty-five sites by the author. Some of them were picked up from factory sites and are therefore quite fresh.

The most important factory site of this culture was located in the vicinity of Lalpur. The tools of this culture were found in association with microliths. But some MSA tools were buried under the greyish soil. This phenomenon was observed in the rain gullies. The LSA tools were lying on the surface. Another factory site was noticed at Sihawal. Here the MSA tools were found along with those of ESA and LSA Cores and chips of MSA were lying in hundreds. The artifacts of this age are separated on the basis of types and techniques. Again the MSA of Basari Hill are classified on the same criterion.

From the investigated part of Bilaspur district, no MSA tool was found. The river was followed up to four miles, but no evidence of MSA was found. Possibly the fine raw material was not there in great quantity. It is not unlikely that further investigations may bring out some evidence.

Fourteen tools of this culture unassociated with the implements of the earlier culture were found *in situ* from the sandy gravel of the river cliffs at Parnia, Jogdah Bridge and Ramnagar and artifacts were obtained from the pebbly gravel of the Johilla at Barachanda. Besides, at the same place, two MSA tools along with one chopping tool were located in the bouldery pebbly gravel, which was lying at the bottom. The chopping tool may be a re-deposit. However, it appears that the earlier culture marked its end along with the deposit of the first period.

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The MSA people preferred fine grained material to the chert, jasper etc. But mostly they employed chert of various kinds.[1] The coarse grained materials like quartzite and sandstone were also occasionally used and less frequently porcellanite was used.

The following are the percentages of the various rocks.

Chert	...	428	—	88.24%
Flint	...	11	—	2 269%
Jasper	...	5	—	1.167%
Agate	...	19	—	3.910%
Sandstone	...	9	—	1.856%
Quartzite	...	10	—	2 062%
Porcellanite	...	3	—	0.6043%

The physical condition of the tools is as follows :—

Unrolled	...	62	—	12.78%
Slightly rolled	...	76	—	15.67%
Rolled	...	286	—	57.64%
Heavily rolled	...	61	—	12.58%

Most of them are patinated while a few tools show effects of weathering.

The artifacts of this age are characterized by having small and very shallow flake scars. (Pl. XI, Figs 1, 2 and 3). Except a few, all the tools were prepared on flakes. The flakes were detached either by 'stone hammer' technique or 'cylinder hammer' technique. The latter was used in those cases which have a narrow platform. In many cases the bulbar scar is also present. Five flakes exhibit preparation of the core before detaching these flakes. They are true Levalloisian flakes. (Pl. XI, Fig. 4, Pl. LVII, Figs. 2, 3, 4)

Retouching was done on the margins. They were mainly done on the upper surface. Some of them were retouched on both the faces. In a few, the retouch was executed on the flake surface.

ARTIFACT TYPES

The industry comprises scrapers, borers and points. Scraper is the main tool-type of this culture. Blades were also used. The tools were smaller than in the ESA. The points probably served some of the purposes of the handaxe.

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1. I have tried to distinguish flint from chert mainly on the basis of the property of fracture. Cryptocrystalline rock with very good conchoidal fracture has been classified as flint, while crypto-crystalline rock with flat and less conchoidal fracture has been classified as a chert. Sometimes the colour of the fresh surface along with its fracture has also been used as one of the criteria for distinguishing flint from chert.

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The artifacts may be divided into following groups :—

A. Scrapers	... 217	—	42.69%
B. Borers	... 4	—	8.249%
C. Borer-scrapers	... 7	—	1.442%
D. Points	... 8	—	1.650%
E. Flakes	... 250	—	51.53%
F. Cores	... 9	—	1.856%

A. Scrapers

This tool-type was known in ESA. But in this culture, it got a unique place.

Many scrapers have two or three types of working edge For instance, one scraper is retouched on the side or sides as well as on end (Pl. LIII, Figs. 1, 2) and sometime one side is hollowed (Pls. LI, Figs. 2, 3; LII, Fig 1). Sometimes, in one scraper, two hollows are made.

On the basis of working edge, this tool type may be classed into the following groups :—

I. Side-scrapers	...	106
II. Hollow-scrapers	...	40
III. End-scrapers	...	4
IV. Side-and-hollow scrapers	...	17
V. Side-hollow-and-end-scrapers	...	9
VI. Side-and-end-scrapers	...	17
VII. Round-scrapers	...	14

A.I. Side-scrapers

They are further divided into two groups :—

(i) Scraping edge along one side	...	89
(ii) Scraping edges along both sides	...	17

A I.i Group i

The side-scrapers of this group may be further classified as follows :—

(a) On flakes	...	77
(b) On cores	...	12

A I.i a On cores

KPR-5 : Side-scraper on a chert core ; rolled ; both the faces flaked showing shallow and step flake scars ; the back is prepared for proper hand-hold.
Size : 57×41×21 (Pl. XLVII, Fig 1)

BSI-27 : Side-scraper on a core of sandstone ; unrolled ; upper surface has more than seven flake scars ; under surface has two long flake scars and one step flake scar.
Size : 72×36×20 (Pl. XLVII, Fig. 2)

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A I.i.b On flakes

RGT-19 : Side-scraper on an end blade like flake of chert ; slightly rolled ; upper surface fully flaked showing centrally directed flake scars, a hump in centre, beautifully retouched at the margin ; primary flake surface shows four small flake scars and a bulbar scar.

Size : 61×31×12 (Pl. XLVIII, Fig. 1)

BHI-6 : Side-scraper on a flake ; chert ; unrolled ; upper surface shows fine flake scars and a patch at the right side ; retouched mainly from the flake surface ; a notch is made at the working edge.

Size : 88×47×18 (Pl. XLVII, Fig. 3)

GTA-3 : Side-scraper on a blade-like flake of chert ; slightly rolled ; upper surface shows one big flake scar and some thin step flake scars near the platform, two patches of cortex, one on right side and the other on the tip ; retouched on the right side ; primary flake with a bulbar scar ; platform removed.

Size : 78×48×17 (Pl. XLVII, Fig 4)

KPR-3 : Side-scraper on a rectangular shaped and flake of chert ; slightly rolled ; upper surface shows big and shallow flake scars and a ridge ; primary flake surface with a bulbar scar and unprepared platform ; scraping edge retouched from the primary flake surface ; opposite side of the working edge flaked for a proper hand-hold.

Size : 91×65×20

JDAH-1 : Similar to KPR-3, but small in size, scraping edge retouched from both the sides ; all the margins except the scraping edge retains cortex.

Size : 60×44×20 (Pl. XLVII), Fig. 2)

A.I.ii Group ii

KRP-9 : Double-sided side-scraper on blade-like flake of chert ; slightly rolled and patinated ; upper surface fully flaked showing shallow and step flake scars and a mid-ridge ; primary flake surface with a bulbar scar and uncortexed platform ; retouched along the margins mainly from the upper surface.

Size : 70×46×11 (Pl. XLVIII, Fig. 3)

BGR-30 : Double-sided side-scraper on a blade of chert ; rolled ; upper surface retains cortex ; retouched along the margins from both the faces.

Size : 64×31×12 (Pl. XLVIII, Fig. 4)

SHL-67 : Double-sided side-scraper on a blade of chert ; rolled ; upper surface has two big and some small shallow and step flake scars at left, a ridge in the centre ; a part of the platform has been flaked ; retouched at right margin from upper surface and at left margin from both sides.

Size : 70×45×16 (Pl. XLVIII, Fig. 5)

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A.II Hollow-scrapers

These may be divided into two groups :—

(i) With one scraping edge	...	35
(ii) With two scraping edges	...	5

A.II.i Group i

These may be further divided as follows :—

(a) On core	...	1
(b) On flake	...	34

A II. i a On core

LGN-7 : Hollow scraper with one scraping edge on core of chert ; rolled ; upper surface has one big step and one steep flake scar ; a ridge in the centre ; under surface shows four flake scars ; the hollow is produced on the right margin by removing flakes from the upper surface.
Size : 55×42×25

A.II.i.b On flake

RNN-1 : Hollow scraper on an oblique flake of jasper ; rolled ; upper surface flaked ; primary flake surface clean with an unprepared platform ; the hollow is the result of removing a big steep flake from the right side of upper surface ; retouches are few and done from the upper surface only.
Size : 71×69×30 (Pl. XLIX, Fig. 1)

DRA-3 : Hollow-scraper on a banded chert flake ; unrolled ; upper surface shows one big and seven thin flake scars ; to make a hollow step flake scar is removed from the primary flake surface ; minute retouches are done in the hollow.
Size : 52×47×19 (Pl. XLIX, Fig. 4)

SHL-69 : Hollow scraper on an end flake of quartzite ; slightly rolled ; upper surface shows some step, steep flake scars, a mid ridge and a patch of cortex at the tip; primary flake surface 'clean' ; hollow is made by removing a few thin flake scars from the upper surface.

Size : 56×41×14 (Pl. XLIX, Fig. 2)

A.II.ii Group ii

SDL-49 : Double Hollow-scraper on a flake of chert ; unrolled ; upper surface flaked, leaving a patch of cortex and a midridge ; both the hollows are made by removing the flakes from the upper surface ; retouched beyond the hollows ; primary flake surface shows one small steep flake scar.
Size : 61×48×17 (Pl. XLIX, Fig. 3)

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A. III End-scrapers

SRI-4 : End scraper on a chert flake ; rolled ; upper surface shows two big flake scars ; one is on the end and the other on the side the rest cortex ; bulb is removed from the primary flake surface ; retouched from both the faces.
Size : 60×68×25 (Pl. L, Fig. 1)

A. IV. Side and hollow scrapers

They may be divided into two groups :—

(i) Simple side and hollow scrapers	...	16
(ii) Tanged side and hollow scraper	...	1

A. IV. i Simple side and hollow scrapers

JDAH-3 : Side and hollow scraper on a chert flake ; unrolled ; upper surface fully flaked showing shallow flake scars ; steeply retouched on both the margins, one of which is concave and the other convex ; a notch made at one end, primary flake surface shows a few small flake scars ; platform removed.
Size : 55×35×12 (Pl. L. Fig. 2)

BHI-10 : Side and hollow-scraper on end flake of chert ; slightly rolled ; upper surface shows two big shallow and one step flake scar ; a mid-ridge runs up to the centre; primary flake surface with a prepared platform ; retouched on the working edges.
Size : 51×44×15 (Pl. L, Fig. 3)

DRA-13 : Side and hollow scraper on a flake of chert ; slightly rolled ; upper surface has two big flake scars and a mid-ridge butt-end tip retains cortex ; at left margin the hollow is produced by removing flake from the under surface on right margin the retouches are done from both the sides.
Size : 70×67×24 (Pl. L, Fig. 4)

A. IV.ii Tanged Side and hollow scraper

RGT-7 : Tanged side and hollow scraper on a blade of chert ; roolled and patinated upper surface shows long shallow flake scars ; primary flake surface 'clean' ; hollow is made by removing a steep flake from primary flake surface at the left side near the tip ; the right side is minutely retouched ; nothces on both sides near the butt-end are produced ; broken at the tip.
Size : 75×34×10 (Pl. LI, Fig. 1)

A. V. Side, hollow and end scrapers

Out of these, two are on core.

A. V. a On core

SHL-26 : A side, hollow and end scraper ; porcellanite ; unrolled but weathered ; upper surface is fully flaked by cylinder hammer, under surface appears to be natural flake surface or part of nodule ; the hollow is made at the right side by removing flakes from both faces ; margins including end are steeply retouched from under surface.
Size : 99×70×19 (Pl. LI, Fig. 3)

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SDL-55 : Side, hollow and end scraper on a core of Jasper ; unrolled ; upper surface shows small shallow flake scars and a mid ridge, under surface has been worked at the tip ; the rest cortex ; the hollow is made by removing a deep flake scar at the right margin, retouched on the margins, end and hollow except a part of a margin which is retouched from under surface from upper surface.

Size : 50×29×15 (Pl. LI, Fig. 2)

A. V. b On flake

FHR-1 : Side, hollow and end scraper on a flake ; partly agate and partly quartzite ; slightly rolled ; upper surface fully flaked ; hollow is produced at the left side by removing two flakes from the upper surface ; margins including end mainly retouched from the primary flake surface ; platform flaked.

A. VI. Side and end scrapers

These tools may be divided into two groups :—

(i)	Single sided side and end scraper	...	12
(ii)	Double sided side and end scrapers	...	5

A. VI. i Group i

They may be further divided as follows :—

(a)	On core	...	1
(b)	On flake	...	11

A. VI. i. a On core

SDL-62 : Side and end scraper on a chert nodule ; slightly rolled and patinated ; flakes are only removed alternatively from the edges ; the rest part of either side retains cortex.

Size : 41×35×19 (Pl. LII, Fig. 2)

A. VI. i. b On flake

JDA-2 : Side and end scraper on a blade-like flake of chert rolled and patinated ; upper surface fully flaked ; primary flake surface with an unprepared platform ; the side and the end are retouched from both the faces ; a recent breakage opposite to the working edge.

Size : 75×53×15 (Pl. LII, Fig. 4)

MKY (1) 10 : Side and end scraper on a side flake of chert ; rolled ; upper surface shows one big and two small flake scars ; primary flake surface with a bulbar scar and an unprepared platform ; the right side and the end retouched from both the faces ; butt has also use marks.

Size : 47×46×17 (Pl. LII, Fig. 3)

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A. VI ii Group ii

These are further sub-grouped into two :—

(a)	On core	...	1
(b)	On flake	...	4

A. VI. ii. a On core

BCA-30 : Double-sided side and end scraper on a core of chert ; rolled ; upper surface flaked leaving a patch of cortex in the centre ; under surface completely flaked ; margins retouched from both faces.
Size : 50×48×21 (Pl. LIII, Fig. 2)

A. VI. ii. b On flake

BCA-31 : Double sided side and end scrapers on a flake of flint ; slightly rolled ; upper surface flaked and a ridge in the centre ; primary flake surface has two flake scars on the butt-end ; platform partly flaked ; right margin and end are retouched from both the faces and left margin only from upper surface.
Size : 73×66×25 (Pl. LIII, Fig. 1)

A. VII Round scrapers

They can be classified as follows :—

(a)	On core	...	7
(b)	On flake	...	7

A. VII. a On core

BGR-9 : Round scraper on a chert core ; unrolled and patinated ; upper surface flaked along the periphery, the centre retains cortex ; under surface beautifully flaked showing shallow and step flake scars ; a small patch of cortex is left on the periphery for holding it suitably ; retouched from both the faces.
Size : 100×62×21 (Pls XI, Fig. 1 ; LIII, Fig. 3)

GRA 3 : Round scraper ; on a chert core ; unrolled ; encrusted with clay : upper surface beautifully flaked, showing shallow flake scars ; under surface partly flaked leaving a patch of cortex ; the periphery steeply flaked ; sharp working edge.
Size : 72×61×14 (Pls. XI, Fig 3 ; LIV, Fig 1)

A. VII. b On flake

SRI-2 ; Oval shaped round scraper on an end flake of chert ; upper surface shows some shallow and step flake scars and two thin patches of cortex ; primary flake surface with a bulbar scar and an unprepared platform ; retouches are done from both the faces.
Size : 72×60×27

B. Borers

GTA-11 : Borer on an end flake of chert ; rolled and patinated ; upper surface shows one flake scar near the platform, the rest cortex borer point obtained by removing flakes from both the sides.
Size : 54×49×16 (Pl. LTV, Fig. 2)

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C. Borer-scrapers

The tools of this variety can be divided on the basis of working edge into two groups :—

I.	Borer and side scrapers	...	4
II.	Borer and round scrapers	...	3

C. I Borer and side scrapers

They may be divided further :—

I.	Borer and single-sided side scraper	...	3
II.	Borer and double-sided side scrapers	...	1

C. I. i Group i

AOI-11 : Borer and single-sided side scraper on a Levalloisian flake of chert ; unrolled ; upper surface has four flake scars and a mid-ridge ; primary flake surface with a bulbar scar and prepared platform ; borer tip is produced by removing flakes from the upper part of the left side ; right side beautifully retouched, mainly on the upper surface ; lower part of the left margin has use marks.
Size : 71 × 40 × 11 (Pl. LIV, Fig. 3).

C. I. ii Group ii

BDA-9 : Borer and double-sided side scraper on a blade-like flake of chert ; rolled ; and patinated ; upper surface shows one big and four flake scars and a mid-ridge ; primary flake surface with a bulbar scar and an unprepared platform ; borer-tip is produced by making two nothces at the sides of the tip sides retouched from both faces.
Size : 74 × 30 × 13.

C. II Borer and round scrapers

SHL-60 : Borer-round-scraper on an end flake of jasper ; slightly rolled and patinated ; upper surface shows four flake scars, one big and the other three small ; the rest cortex, primary flake surface has a step flake scar at a corner, a prominent bulb and a bulbar scar ; long unprepared platform ; the flake is beautifully retouched along the tip and sides.
Size : 59 × 59 × 24 (Pl. LIV, Fig. 4).

D. Points

These can be divided into two groups :—

(1)	Long	...	4
(2)	Small	...	4

D. 1 Group 1

They may be further divided :—

(a)	On core	...	2
(b)	On flake	...	2

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D. 1. a On core

PNA-7 : A triangular point of chert ; unrolled ; encrusted with clay ; upper surface steeply flaked, leaving a patch of cortex in the centre ; a mid ridge ; under-surface fully showing shallow and step flake scars and a mid-ridge ; the step flake scars are removed along the margins to make sharp edge ; rhomboid cross-section.
Size : 88×71×30 (Pls. XI, Fig. 2, LV, Fig. 1).

D. 1. b On flake

DRA-8 : A point on a chert flake ; slightly rolled ; upper surface fully flaked ; primary flake surface flaked at the butt end ; margins retouched from both the faces.
Size : 82×53×30 (Pl. LV, Fig. 2).

D. 2 Group 2

All are on flake. They may be divided as :

(i) Simple points	...	3
(ii) Tanged point	...	1

D. 2. i Simple points

APR-5 : Triangular simple point on an oblique flake of chert ; rolled ; upper surface has two big flake scars and a patch of cortex at left ; retouched mainly from the upper surface.
Size : 57×50×13 (Pl. LVI, Fig. 1).

D. 2. ii Tanged point

SHL-61 : A tanged point on a flake of jasper ; slightly rolled ; upper surface fully flaked ; primary flake surface shows one shallow step flake scar ; one notch is made near an end to produce a tange and opposite side of the notch is concave ; retouched on the tip and sides.
Size : 60×31×11 (Pl. LVI, Fig. 2).

E. Flakes

Flakes are two hundred fifty in number. These flakes are excluding those on which the tools are prepared. The flakes may be classified into three groups :—

I.	Blades	...	4
II.	Blade-like flakes	...	3
III.	Flakes	...	243

E. I Blades

JDA-28 (*in situ*) : Long blade of agate, unrolled ; upper surface shows three big longitudinal and one small step flake scars ; platform is removed showing thin step flake scar ; primary flake surface with a bulbar scar ; use-marks on the edge.
Size : 100×30×9 (Pl. LVI, Fig. 4).

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JDA-29 (*in situ*) : Parallel sided blade of chert ; unrolled ; upper surface shows one big longitudinal and some small flake scars and a mid-ridge ; a small patch of cortex at the tip ; primary flake surface with a part of bulbar scar.
Size : 65×27×15

E. II Blade-like flakes

The blade-like flakes and simple flakes are not illustrated as tools made on these are illustrated.

BBI (1)-21 ; A flake-blade of chert ; slightly rolled and patinated ; upper surface is worked by the removal of large and shallow flake scars, primary flake surface with a bulbar scar and cortexed platform.
Size : 105×40×12 (Pl. LVI, Fig. 3).

E. III Flakes

The flakes, on the basis of technique, may be divided into three broad groups.

(1)	Simple flakes	...	237
(2)	Faceted platform flake	...	1
(3)	Levalloisian flakes	...	5

E. III. 1 1. Simple flakes

A majority of the flakes are simple. They are two hundred thirty-seven. All the flakes which have been removed without any special preparation and have unprepared platform are kept in this group. Some of them have been partly worked leaving patches of cortex on the upper surface and in some the upper surface is fully flaked. These flakes were worked after detaching them from the cores.

According to the nature of the striking platform, they are further classified, as follows :—

(a)	Cortexed platform	...	95
(b)	Uncortexed platform	...	89
(c)	Indeterminate platform	...	53

All of them, on the basis of size, are further grouped into two divisions :
(i) large, and (ii) small.

E. III. 1. a Cortexed platform

Out of ninety-five, twenty-five are long flakes and the rest small.

E. III. 1. a. 1 Group 1

On the nature of the flakes, they are further divided :—

(i)	End flakes	...	10
(ii)	Side flakes	...	7
(iii)	Oblique flakes	...	8

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E. III. 1. a. 1. i End flakes

JDA-12 : An end flake of chert ; unrolled and patinated ; upper surface shows two large and some shallow and step flake scars, a small patch of cortex opposite the platform ; primary flake surface clean ; cortexed platform

Size ; 73×79×72.

E. III. 1. a. 1. ii Side flake

BCE-2 : Side flake of chert ; rolled ; upper surface shows some shallow and step flake scars ; primary flake surface clean.

Size : 60×50×20.

E. III. 1. a. 1. iii Oblique flake

ACI-12 : An oblique flake of slightly rolled and patinated ; upper surface show two big, four shallow and two step flake scars and a ridge in the centre ; primary flake surface with a bulbar scar ; cortexed platform.

Size : 65×44×11.

E. III. 1. a. 2 Group 2

According to the nature of flakes, they are also divided into the following groups :—

(i)	End flakes	...	32
(ii)	Side flakes	...	10
(iii)	Oblique flakes	...	28

E. III. 1. a. 2. i End flakes

GRA-16 : A point shaped end flake of chert ; unrolled and patinated ; upper surface shows one big and three small shallow flake scars and a mid-ridge ; primary flake surface clean ; cortexed platform ; retouched at margin.

Size : 49×46×13.

E. III. 1 a. 2. ii Side flake

KPR-4 : A roughly triangular shaped side-flake of chert ; rolled ; upper surface shows one big shallow and three small step flake scars and a patch of cortex near the base ; primary flake surface clean ; cortexed platform ; some retouches near the tip.

Size : 52×45×11.

E. III. 1. a. 2. iii Oblique flake

GRA-7 : A triangular shaped oblique flake of chert ; slightly rolled ; upper surface shows two small shallow flake scars at the base, the rest cortex, a mid-ridge runs up to the centre ; primary flake surface shows one flake scar at the base ; cortexed platform.

Size : 45×40×14.

E. III. 1. b. Un-cortexed platform

Among eightly-nine, twenty-four are big and the rest small.

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E. III. 1. b. 1 Group 1

According to the nature of flakes, they are classified as follows :—

(i)	End flakes	...	10
(ii)	Side flakes	...	3
(iii)	Oblique flakes	...	11

E. III. 1.b.1.i End flake

SPR-13 : An end flake of chert ; slightly rolled and patinated ; upper surface shows one big, some shallow and step flake scars, a patch of cortex and a mid-ridge ; primary flake surface shows some thin flake scars; uncortexed platform.
Size : 80×65×25

E.III.1.b.1.ii Side-flake

SHL-53 : A side flake of quartzite; unrolled; upper surface shows some shallow flake scars and a small patch of cortex ; primary flake surface clean ; uncortexed platform.
Size : 98×60×19

E.III.1.b.1.iii Oblique flake

GRA-41 : An oblique flake of slightly rolled ; encrusted with clay ; upper surface shows one big and some small shallow and step flake scars ; primary flake surface with a bulbar scar.
Size : 85×64×16

E. III. 1.b.2 Group 2

They can also be classified further on the basis of the nature of flakes :

(i)	End flakes	...	37
(ii)	Side flakes	...	16
(iii)	Oblique flakes	...	12

E. III. 1.b.2.i End flake

SDL-36 : A small flake of quartzite ; unrolled ; upper surface shows two shallow, one big and the other small, three or four small step flake scars, a patch of cortex and a mid-ridge ; primary flake surface clean ; minutely retouched along the left side.
Size : 46×44×19

E. III. 1. b. 2. ii Side-flake

BBI (1)-62 : A side flake of chert ; rolled and weathered ; upper surface shows some shallow and step flake scars and patch of cortex ; primary flake surface with a bulbar scar.
Size : 58×51×18

E.III.1.b.2.iii Oblique flake

LPR-36 : An oblique flake of chert ; unrolled and patinated ; upper surface shows one big and some shallow and step flake scars ; primary flake surface 'clean'.
Size : 53×33×19

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E.III.1.c Indeterminate platform

In some cases, the platform has been removed is broken and therefore, its exact nature could not be known.

Out of fifty-three, eleven are big and the rest are small.

E. III. 1. c. 1 Gronp 1

LPR-2 : An indeterminate flake of chert ; unrolled ; and patinated ; upper surface shows some shallow and step flake scars and a patch of cortex ; primary flake surface 'clean' ; platform subsequently removed.
Size : 76×62×22

E. III 1. c. 2 Group 2

BGR-29 : A point-shaped indeterminate flake of chert ; rolled ; upper surface flaked leaving a small patch of cortex in the centre ; primary flake surface 'clean', retouched near the tip.
Size : 55×39×12

E. III. 2. Faceted platform flakes

Generally in India scholars call all flakes which have prepered platform as 'Levalloisian flakes.' In fact, 'it is only a secondary feature' of Levalloisian technique. 'The principal element in the Levalloisian technique is the preparation of the flake on the core prior to its removal in such a way that the flake, when it has been struck off the core, requires little or no secondary trimming to shape it into a tool.'[1] Hence, the Levalloisian flakes on their upper surfaces have centrally directed flake scars.

Here it is thought advisable to keep separately all those flakes on which the prior work is crude or only the platform is prepared from the true 'levalloisian' flakes.

SDI-8 : A prepared platform flake of chert ; unrolled ; upper surface shows two big and some step flake scars and a patch of cortex, a zigzag ridge in the centre ; primary flake surface shows one flake scar.
Size : 70×51×24 (Pl. LVII, Fig. 1)

E.III. 3. Levalloisian flakes

PNA-4 : A flake of chert ; slightly rolled and patinated ; the upper surface is worked by very shallow flaking ; primary flake surface with a bulbar scar ; prepared platform ; retouched minutely along the margin.
Size : 71×50×19 (Pls. XI, Fig. 4, LVII, Fig. 4)

GRA-31 : A Levalloisian flake of chert ; slightly rolled and patinated ; upper surface shows three big flake scars ; primary flake surface with a bulbar scar ; prepared platform.
Size : 40×37×9 (Pl. LVII, Fig. 2)

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1. Misra, V.N., 1961, The stone Age cultures of Rajputana, Ph. D. Thesis, copies in the libraries of the Deccan College and Poona University, p. 297.

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APR-7 : A Levalloisian flake of chert ; rolled and patinated ; upper surface shows six flake scars ; primary flake surface with a bulbar scar ; prepared platform.
Size : 46×43×10 (Pl. LVII, Fig. 3)

F. Cores

BSA-29 : A big core of jasper ; several flakes have been removed from both the faces; the edges have been blunt, either by rolling or by being used as a hammer.

Rejects

On the field, the author collected chips from factory sites for a workshop. These chips are kept in the group. They are nearly one hundred and fifty.

LATE STONE AGE CULTURE

Eight hundred sixty-two LSA tools, including cores and flakes, were collected from fifty-one sites. These microliths are purely non-geometric and devoid of pottery. Recent excavation of a microlithic site in the Mirzapur District also indicated that the first industry of LSA was not geometric and unassociated with pottery.

The collection consists of scrapers, points, borers, borer-cum-scrapers, retouched or utilized blades, simple blades, flakes cores, fluted cores, flakes and chips. Some flakes also have use-marks and might have been used for scraping. From the fluted cores beautiful blades are removed. (Pl. XII Fig 5, 6 and 7). The tools made on flakes have both types of platform ; prepared and unprepared. Some fluted cores have cortex on their surfaces, but the blades are never seen to have cortexed surface. The cores were prepared by removing small chips by soft cylinder hammer. Then on a side of the core, a sample or multiple platform was prepared (Pl. XII, Figs. 8, 9 and 10). The raw material of some fluted cores is very soft and, therefore, some blades might have been removed by pressure technique. Flakes were struck off from the cores, which are called 'flake cores' for making scrapers, points, borers etc. The tools are retouched generally on one side, but some of them are retouched on both sides. (Pl. XII, Figs. 1, 2). The points are simple (Pl. XII, Fig. 3) as well as tanged (Pl. XII, Fig. 4).

Various types of rocks with the following percentages were used in this culture of the Upper Son Valley :

1. Chert	...	756
2. Jasper	...	5
3. Agate	...	23
4. Chalcedony	...	51
5. Sandstone.	...	4
6. Quartz	...	6
7. Flint	...	16
8. Rhyolite	...	1

The physical condition of the tools is as follows :—

Unrolled	...	413
Slightly rolled	...	340
Rolled	...	109

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Some of them have undergone patination.

The collection of LSA may be divided into the following categories :—

A. Scrapers	...	142
B. Borers	...	9
C. Borer-scrapers	...	5
D. Points	...	32
E. Blades	...	152
F. Cores	...	42
G. Flakes and chips	...	480

A. Scrapers

The scrapers may be further divided into the following groups :—

I. Side-scrapers	...	59
II. Hollow-scrapers	...	24
III. End-scrapers	...	18
IV. Side and end-scrapers	...	12
V. Side and hollow-scrapers	...	5
VI. Side, hollow and end-scrapers	...	2
VII. Hollow and end-scrapers	...	6
VIII. Round scrapers	...	16

A.I Side-scrapers

According the nature of working edges, these specimens may be divided into two groups :

(i) Single-sided side-scrapers	...	57
(ii) Double-sided side-scrapers	...	2

A.I i Group i

These may be further divided as :—

(a) On cores	...	5
(b) On flakes	...	52

A I.i.a On cores

BBI (11)-5 : Side-scraper on a small core of chalcedony ; both the faces are steeply flaked at one side which forms the working edge the rest portions of both the surface and back retains cortex ; sharp edge.

Size : 25×24×11 (Pl. LVIII, Fig. 1)

A.I i.b On flakes

BBI-(11)-33 : Side-scraper on an end flake of agate ; unrolled ; upper surface shows one big and four very thin flake scars and mid-ridge retouched on both the faces ; opposite side thick and retains cortex.

Size : 37×24×11 (Pl. LVIII, Fig. 2)

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KPR-11 : Side-scraper on an end flake of chert ; slightly rolled ; upper surface cortexed with central ridge, three flake scars on the opposite side of working edge ; retouched from both the faces ; platform shows a patch of cortex and a few thin flake scars ; back thick for proper hand-hold.

Size : 43×29×15 (Pl. LVIII, Fig 3)

SDL-51 : Side-scraper on an oblique flake of chert ; rolled ; upper surface partly flaked leaving a patch of cortex ; primary flake surface shows one thin step flake scar ; and a prominent bulb ; retouched from both the faces.

Size : 39×32×12 (Pl. LVIII, Fig. 5)

HNI-232 : Side-scraper on a flake of agate ; unrolled ; upper surface fully flaked ; retouched mainly on the upper face.

Size : 33×23×13 (Pl. LVIII, Fig. 6)

HNI-224 : Side-scraper on a flake of chert ; weathered ; upper surface fully flaked ; primary flake surface has a flake scar on the margin ; retouched on the upper face.

Size : 27×18×8 (Pl. LVIII, Fig. 7)

BBI-(II)-117 : Sidescraper on an end-flake of chert ; unrolled ; upper surface fully flaked ; primary flake surface with a prominent bulb ; opposite side of the working edge retains cortex ; retouched on the upper surface.

Size : 26×19×7 (Pl. LVIII, Fig. 4)

A.I.ii Group ii

HNI-209 : Double-sided side-scraper on an end-flake of chalcedony ; unrolled ; upper surface fully flaked leaving a patch of cortex and a mid-ridge ; primary surface with a prominent bulb ; right margin retouched on both surfaces ; left margin retouched on upper surface.

Size : 28×18×10 (Pl. LVIII, Fig. 8)

A.II Hollow scrapers

According to the nature of the working edge, they are divided into two groups :—

(i)	With one scraping edge	...	21
(ii)	With two scraping	...	3

A.II.i Group i

BHI-29 : Hollow-scraper on a flake of flint ; fresh ; upper surface shows shallow flake scars ; primary flake surface has some flake scars at the margin ; the hollow is steeply worked.

Size : 22×21×9 (Pls. XII, Fig. 1 ; LVIII, Fig. 9)

A.II.ii Group ii

MJA-11 : Hollow-scraper on an end flake of chert ; slightly rolled ; upper surface partly flaked, leaving two patches of cortex and a mid-ridge ; primary flake surface 'clean',

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Size : 40×28×15 (Pl. LVIII, Fig. 10)

A III End-scrapers

The may be divided into two groups :—

(a)	On core	...	1
(b)	On flake	...	17

A.III a On core

BHI-19 : End scraper on a core of chert ; unrolled ; both the faces are partly flaked ; a patch of cortex at both sides ; beautifully retouched on the upper surface at the end.

Size : 34×30×11 (Pl. LVIII, Fig. 11)

A.III.b On flake

LPR-12 : End-scraper on a flake of chert ; slightly rolled ; upper surface shows shallow flake scars, a mid-ridge ; primary flake surface with a bulbar scar ; platform removed; working-edge beautifully retouched.

Size : 30×23×7 (Pl. LVIII, Fig. 12)

HNI-32 : End-scraper on a blade of chert ; fresh ; upper surface fully flaked ; retouched from the upper surface at an end.

Size : 46×28×10 (Pl. LVIII, Fig. 13)

A.IV. Side and end scrapers

They may be classified into the following groups :—

(i)	Single sided side and end scrapers	...	5
(ii)	Double sided side and end scrapers	...	7

A.IV.i Group i

JDAH-21 : Side-end scraper on a flake of rhyolite ; unrolled ; upper surface shows one big and some small shallow flake scars ; side and end are retouched.

Size : 133×30×9 (Pl. LVIII, Fig. 14)

A.IV.ii. Group ii

(a)	On core	...	1
(b)	On flake	...	6

A.IV.ii.b On flake

BDA-21 : Double sided side and end scraper on a flake of chert ; slightly rolled ; upper surface shows three shallow flake scars and a mid-ridge ; retouched along the periphery from the primary flake surface ; platform has been removed.

Size : 41×38×10 (Pl. LIX, Fig. 2)

URA-14 : Double sided side and end scraper on a flake of agate ; rolled ; upper

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surface shows two flake scars and a mid-ridge ; primary flake surface with a bulbar scar ; sides retouched on both faces ; end retouched on primary flake surface.

Size : 47×39×10 (Pl. LIX, Fig. 1)

A.V. Side and hollow scrapers

BHI-31 : Side and hollow scraper on a flake of flint ; unrolled ; upper surface partly flaked ; right margin retouched on both faces ; hollow is produced on the left margin by removing flakes from both faces.

Size : 24×19×5 (Pl. LIX, Fig 5)

A.VI. Side, hollow and end scrapers

SHL-37 : Side-hollow and end scraper on a chert flake ; unrolled; upper surface flaked leaving a small patch of cortex near the platform ; primary flake surface 'clean' ; hollow is steeply retouched ; end mainly retouched from the upper surface ; the side is retouched from both the faces.

Size : 34×25×10 (Pls. XII, Fig. 2 ; LIX, Fig. 4)

A. VII. Hollow and end scrapers

The specimens may be further divided :—

(i)	Single hollow and end scrapers	...	5
(ii)	Double hollow and end scraper	...	1

A. VII i Group i

SHL-127 : Single hollow and end scraper on a side flake of agate ; slightly rolled upper surface shows four flake scars ; the hollow is produced by steeply removing thin flakes from the primary flake surface ; the end is also retouched on the primary flake surface.

Size : 37×26×7 (Pl. LIX, Fig. 3).

A VII. ii Group ii

HNI-91 : Double hollow-end scraper on an end flake of chert ; unrolled ; upper surface partly flaked, leaving a big patch of cortex ; primary flake surface shows one flake scar at the margin, a few flakes are removed from the platform ; hollow is made at either side ; the hollow at the right side is retouched from both the faces ; the hollow of the left side and the end are retouched on the upper surface only.

Size : 39×40×15 (Pl LIX, Fig. 6).

A. VIII Round-scrapers

BSI-45 : Round-scraper on a flake of sandstone ; unrolled ; upper surface flaked showing shallow and step flake scars ; from the primary flake surface the flakes are removed at the margin.

Size : 39×40×12 (Pl. LIX, Fig. 7).

B. Borers

BHI-23 : Borer on an oblique flake chert ; unrolled ; upper surface shows shallow

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and step flake scars and a patch of cortex ; primary flake surface clean with a prominent bulb.

Size : 33×35×12 (Pl. LIX, Fig. 8)

C. Borer-scrapers

The specimens may be further divided into the following groups :—

I. Borer and side scrapers	...	4
II. Borer, side and end scraper	...	1

C. I. Borer and side scrapers

KNR-5 : Borer and side scraper on a flake of chert ; rolled and weathered ; upper surface fully flaked ; borer tip produced by removing thin flakes near the tip ; left margin retouched on the upper surface.

Size : 40×40×10 (Pl. LIX, Fig. 9).

C. II. Borer, side and end scraper

HNI-215 : Borer, side and end scraper on a flake of chert ; unrolled ; upper surface fully flaked ; borer-point is produced by removing flake scars from the primary flake surface on both sides of the tip ; right margin retouched on the primary flake surface ; opposite side of the borer-tip is retouched on the upper surface.

Size : 35×30×13 (Pl. LIX, Fig. 10)

D. Points

The collection contains thirty-two points. These points vary from 1.8 cm to 6.6 cm. They may be further divided as follows :—

1. Big points	...	15
2. Small points	...	17

D. 1 Group 1

All are simple and vary from 4 cm to 6.6 cm.

HNI-85 : Point on an end ; prepared platform ; flake of silicious rock ; unrolled ; upper surface shows four shallow and one step flake scars ; primary flake surface with a bulbar scar and prepared platform ; retouched along the margin ; tongue-like tip

Size : 58×56×17 (Pl. LX, Fig. 1)

HNI-17 : Point on a flake of silicious rock ; unrolled ; upper surface shows some long and shallow flake scars ; primary flake surface with prepared platform ; retouched along the margin.

Size : 66×30×15 (Pl. LX, Fig. 2)

D. 2. Group 2

They can be further classified into two :—

(i) Simple points	...	15
(ii) Tanged points	...	2

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D. 2. i Simple points

SHL-111 : Triangular point on a flake of chalcedony ; unrolled ; upper surface shows two shallow flake scars and a small patch of cortex ; primary flake surface 'clean' ; beautifully retouched from both the sides along the margins.

Size : 35×30×10 (Pls. XII, Fig. 3, LX, Fig. 3).

BLI-8 : Point on a flake of chalcedony ; slightly rolled ; upper surface shows some shallow and step flake scars ; a patch of cortex at the left side ; primary flake surface with a bulbar scar ; retouched along the margin from the upper surface.

Size : 31×32×9 (Pl. LX, Fig. 4).

LPR-38 : Point on an end flake of chert ; slightly rolled ; upper surface flaked showing shallow and step flake scars and a mid-ridge ; the right side retouched from the primary flake surface ; and the left side from the upper surface.

Size : 36×20×8 (Pl. LX, Fig 7)

BNA-3 : Point on a flake of chert ; slightly rolled ; upper surface shows two flake scars and a mid-ridge ; the right side is retouched from the upper surface and the point and left side mainly from the primary flake.

Size : 23×14×6 (Pl. LX, Fig. 5).

D.2.ii Tanged points

HNI-65 : Tanged point on a flake of reddish chert ; unrolled ; upper surface shows two long and some very small shallow flake scars ; mid-ridge ; and a small patch of cortex at the right side near the tip ; the ridge is flaked near the butt, probably for proper hafting ; retouched from both the faces ; the tang is produced by flaking mainly from the primary flake surface.

Size : 37×25×15 (Pls. XII, Fig. 4, LX, Fig. 6)

E. Blades

Blades which seem to be used are called 'used blades' and those which have no sign of use kept under the title of 'simple blades'.

E.I Used blades

These blades have use maks and retouches either on one side or on both the sides. Thirty-five specimens occur in this group.

HNI-33 : Blade of chert ; unrolled ; upper surface shows one long and some small shallow and step centrally directed flake scars ; retouched on both edges from both sides.

Size : 64×24×10 (Pls. XII, Fig. 6, LXI, Fig. 1)

BLI-5 : 'Parallel sided blade of chert ; slightly rolled ; upper surface shows one big longitudinal flake scar and three small flake scars, a mide-ridge ; a thin patch of cortex near the tip ; oblique tip ; primary flake scar with a bulbar scar ; retouched on both the edges from both the sides.

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Size : 55×23×9 (Pls. XII, Fig. 5 ; LXI, Fig. 3)

HNI-34 : Parallel-sided blade of chert ; unrolled ; upper surface shows two longitudinal flake scares and a mid-ridge ; a thin patch of cortex runs at margin from bottom to tip ; this side is thick for proper hand-hold ; retouched on the left side.

Size : 50×22×8 (Pl. LX, Fig. 8)

E.II Simple Blades

There are one hundred seventeen specimens in this group.

KRR-2 : Parallel sided blade of chert ; slightly rolled ; upper surface partly flaked, leaving a patch af cortex at the right side and a mid-ridge ; primary flake surface with a bulbar scar ; small platform.

Size : 64×29×9 (Pls. XII, Fig. 7, LXI, Fig. 2)

HNI-67 : Paralled blade of chert ; unrolled ; upper surface shows long shallow flake scars and a mid-ridge ; primary flake surface with a bulbar scar.

Size : 43×16×5

KRR-205 : A thin and small parallel sided blade of chert ; slightly rolled ; upper surface shows two big and three small shallow and one step flake scars, a mid-ridge; primary flake surface with a narrow platform.

Size : 34×11×4

KRR-272 : A thin and small paralled sided blade of chert ; slighty rolled ; upper surface shows three long shallow and one small step flake scars ; primary flake surface is encrusted with clay.

Size : 30×8×3

KRR-28 : Parallel sided sided blade of chert ; slightly rolled ; upper surface slightly encrusted with clay, nine flake scars ; primary flake surface 'clean' one thin patch of cortex at the right margin near the tip ; platform retains cortex.

Size : 48×23×8 (Pl. LXI, Fig. 4)

F. Cores

The cores may be divided into two groups :—

I. Flake cores	...	11
II. Blade cores	...	31

F. I Flake cores

BBI (1)-97 : Roughly rectangular core of dark greenish chert ; only from the right side of the upper surface ; flakes are removed ; from the under surface some shallow and one deep flake are removed.

Size : 95×85×37

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F II Blade cores

They are divided into three varieties as have been done by Barnes[1] and Sankalia.[2]

(i)	Pointed Cores	...	16
(ii)	Chisel or oblique ended cores	...	10
(iii)	Flat based cores	...	5

F.II.i Pointed cores

SHL-92 : A pointed core of chert ; smooth platform is produced by removing some chips ; four scars of blades meet at the point ; cortex on the left side ; opposite side shows two scars of blades which could not proceed beyond half the length of the core, the rest cortex.

Size : 47×35×25 (Pls. XII, Fig. 10, LXI, Fig. 8)

F.II ii Chisel or oblique ended cores

HNI-9 : Oblique-ended core of chert ; faceted rough platform ; upper surface shows a number of blade-scars ; under surface has five flake scars, the flakes were removed from another side, the former flake, scars have been truncated.

Size : 47×30×21(Pl. XLI, Fig. 5)

HNI-2 : Chisel ended core of chert faceted platform ; upper surface has a number of blade-scars ; the chisel end is produced by removing small shallow flakes ; under surface shows some small scars, and one big blade-scar, a patch of cortex.

Size : 67×31×27 (Pls. XII, Fig. 9 ; LXI, Fig. 6)

F.II iii Flat-based cores

HNI-1 : Flat-based core of chert ; faceted platform on one side ; the other side has a deep flake scar, which forms platform ; a number of blades are removed from both the sides, but most of them are the result of unsuccessful attempts ; under surface shows three flake scars removed from another side truncating with former flake scars, a small patch of cortex at the corner of this side.

Size : 51×47×29 (Pls. XII, Fig 8, LXI, Fig. 7)

G. Flakes and chips

Four hundred eighty flakes and chips (mostly flakes) have been collected from the various sites of the region. Some of them show use-marks. It is likely that when they were removed from the cores they were very sharp and therefore they were used without retouches. Some chips were seen to be removed at the time of preparing the cores and tools.

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1. Barnes, A S., (1947, "The Technique of Blade Production in Mesolithic and Neolithic Times," *P P.S.* Vol. XIII, p. 105
2. Sankalia, H.D., Stone Age Tools, Their Techniques, Name and Functions, Poona, 1964, p. 39.

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7

Comparison of Stone Age Cultures

The cultural horizons and pleistocene sequences of the Upper Son Valley are compared with the other regions to know their positions in the development of Stone Age Cultures. However, it must not be forgotten that the industries of various regions were more or less influenced by the local factors ; the environment, geology, topography, vegetation, climate and animals ; hence some variations are bound to occur in them.

The comparison is first made with industries within India and then with those outside India.

(i) WITHIN INDIA

PUNJAB

Potwar

The Potwar region, which lies between the Indus and Jhelum, including the Salt Range, was examined by De Terra and Paterson.[1] The latter has recently published a revised study of the cultural horizons.[2]

These scholars had successfully located six terraces (including TD) in the Sohan Valley ; nowhere else in the Potwar is the Pleistocene history so well recorded as along the Soan River and its tributaries." The terraces TD and TI placed in the Second Glacial and Second Interglacial, respectively fall in the Middle Pleistocene. Terraces 2 and 3 originated in Third Glacial and Interglacial period. The succeeding terrace viz., T4 has been connected with the Fourth Glacial period. The last terrace T5-belongs to Post-glacial and Holocene time.

The oldest artifacts are located in the Boulder Conglomerate and are placed in the earliest Middle Pleistocene or Lower Pleistocene. The collection contains six flakes and two pebble tools. Till today this industry was known as 'Pre-Sohan' industry but now Paterson inclines to call it Lower Sohan A.[3] The tools in Lower Sohan B are found from the high depositional

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1. De Terra, H., and Paterson, T.T., 1939, Studies on the Ice Age in India and Associated Human Culture, pp. 252-312
2. paterson, T.T., and Drummond, H.J.H., 1962, Soan, the Palaeolithic of Pakistan.
3. Paterson, T.T., and Drummond, H.J.H., 1962, Soan, the palaeolithic of Pakistan pp. 59-60

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surface of the Boulder Conglomerate and placed in the first phase of the Middle Pleistocene. The third cultural stage, called 'Middle Sohan A' is located on the highest depositional terrace surface of the Boulder Conglomerate which belongs to the beginning of the second phase of the Middle Pleistocene. Middle Sohan B occurs in gravels of the second phase of the Middle Pleistocene. The tools of the Upper Sohan divided into two phases, viz, Upper Sohan A and Upper Sohan B are found in the gravels of third glacial age (Terrace 2) and the basal gravels of the terrace 3 and dated to the first phase and the second phase of the Upper Pleistocene, respectively. The First Sohan industry comes from Dhok Pathan and the Fourth Glacial Age. The Upper Clacton industry, classified into two groups, occurs in the basal gravel and in the Potwar Loess, a few feet above the gravel. As it intervenes between the Upper Sohan A and Upper Sohan B, it is regarded as an intrusive culture.[1] The Abbevillio-Acheulian and Acheulian artifacts are dated to the second phase of the Middle Pleistocene and the second phase of the Upper Pleistocene and called 'Middle Stellenbosch' and 'Upper Stellenbosch', respectively. At Morgah the Acheulian tools are found along with the tools of the Upper Sohan and hence it is designated as Upper Sohan Stellenbosch.[2]

The results of the Italian expeditions show that handaxes, cleavers and pebble tools come from the same horizon.[3]

The choppers of our collection made on rounded or oval pebbles, and generally having flat under surface cannot be compared with Sohanian choppers as the latter show a large flake scar on their surfaces, while the choppers of the Upper Son Valley have a few scars. Some chopping tools and discoids may go with the similar tools of the Sohan. Abbevillian and Acheulian handaxes are also comparable with the handaxes of all the three stages of the Upper Son Valley. However, it must be mentioned that the industries of both the regions belong to two different traditions—chopper—chopping—tool and handaxe and to completely different environmental features.

The microliths made of jasper and flint were also picked up from the Potwar loess surface,[4] but details are not available and hence the comparison of these tools with similar ones cannot be made.

Beas and Banganga Valleys

In the Banganga Valley near Guler, five terraces were traced by Lal[5] The first terrace having the height of 565 ft. from the river bed and 1964 ft. above sea level is formed by large sized boulders, intermixed with medium to small sized sub angular pebbles and

1. Paterson, T.T. and Drummond, H.J.H., 1962, Soan, the Palaeolithic of Pakistan, p. 92.
2. *Ibid.*, pp. 95 ff.
3. Graziosi, P., 1964, Prehistoric Research in North Western Punjab, pp. 13-47
4. Krishnaswami, V.D., 1947, Stone Age India, *A.I.*, No. 3. p. 22
5. Lal, B.B., 1956, Palaeoliths from the Beas and Banganga Valleys, Punjab, *A.I.*, No. 12, pp. 59-92

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overlain by reddish sandy soil. The tools were found mostly on the surface. The terrace 2 with an height of 375 ft. from the river level is constituted by the deposits of gravel and silt. Palaeoliths were discovered from the *nullah* and the slope of the terrace. At a height of 150 ft. from the river level is T^3 consisting of medium sized boulder following by a thin layer of silt. On the level of 90 ft. and 30 ft. are the terraces 4 and 5. No tool could be encountered from them.

At Dehra on the river Beas, from a thick gravel bed of terrace at the height of 115 ft. from the river level palaeoliths were discovered.

About the genuineness of some of the tools,[1] doubts are raised because of the Banganga and Beas originate from the high Himalayas. C.A. Burland, who investigated Cromer Beach, Norfolk, writes that he got "hundreds of stones, there were some hundred and fifty that were worth second examination—of these twenty-three were of sufficient interest to bring home for meditation." After the discovery of Banganga and Beas tools, Desmond Clark showed from the evidence recovered from the Batoka gorge[2] that rivers falling from a high altitude yield flaked-pebbles and flakes removed by natural agencies. However, on this point, nothing can be said with certainty unless a detailed re-examination of these valleys is done, but the association of higher altitude with these tools cannot be ruled out from our mind.

The choppers and chopping-tools cannot be compared with the similar tools of Upper Son Valley. The discoids of these Valleys are very inferior. No specimen is comparable with the pebble-handaxes of Banganga Valley. The Abbevillian handaxes also cannot be compared. However, we fail to have a fair idea about the Acheulian handaxe from the drawing and therefore difficulty is faced in the comparison.

Sirsa Valley

Sen explored the area around Nalagarh on the river Sirsa, a tributary of the Sutlej.[3] He located three terraces having heights of 70 ft., 40 ft. and 10 ft. and named them, Upper, Middle and Lower. Except latter, both of them are covered by gravel spread. The distinction between them is made on the nature of gravels. The Upper Terrace has cemented gravel, while the Lower unconsolidated and covered by thin layer of silt or clay.

The tools discovered from this valley are made on fine grained quartzite. They fall into two groups : pebble tools and flake tools. There is not much typological variation between the tools from the Upper and Middle terraces except that Pebble tools appear to be

1. Burland, C.A., 1950, The High level gravels : A comparison with Cromer Beach, *SAAB*, Vol. V, pp. 23.
2. Clark, J. D., The Natural Fracture of Pebbles from Batoka Corge, Northern Rhodesia, and its bearing on the Kafuan industries of Africa, 1958, *PPS*. Vol. XXIV, pp. 64-67.
3. Sen, D., Nalagarh Palaeolithic Culture, *M. I.*, 1955, Vol. 35, No. 3, pp. 177-184.

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slightly more frequent in the Upper terrace than in the Middle terrace and that the general workmanship of the tools from the Middle terrace."[1]

Prufer claimed to have fossil wood artifacts from some sites[2], but in the absence of detailed description and illustration of these artifacts, nothing can be said on their nature and relationship with palaeolithic tools.

Flakes having high angles with centered or simple unfaceted platforms are found, and there is no evidence of Levalloisian flakes.

These flakes may be compared with the flakes of the Upper Son Valley.

GUJARAT

In the Sabarmati Valley, Gujarat, the artifacts of ESA industry come from the gravel conglomerate, the junction of gravel and silt and the lower half of the silt. This industry contains choppers, chopping-tools, discoids, handaxes, cleavers and flakes. Both types of tools—cruder and fine—made by 'stone hammer' and 'cylinder hammer' techniques are found from the bottom stratum—gravel conglomerate, and, therefore, the cultural evolution or technical development cannot be attested From the Upper Son Valley the implements of this industry—though they are divided into three stages - are found from the lower horizon ; no specimen comes from the junction of gravel and silt or silt.

In discoids of the Upper Son Valley the working edge is formed by the intersection of the sloping of both the surfaces but in two cases the working edge is formed by the steep flake scars removed from a side of the upper surface with the flaked nearly plain under surface. These characteristics are also seen in Gujarat's specimens. The tools showing deep and big scars may be compared with the tools of our Stage I and II and some well trimmed tools may be correlated with the tools of Stage III.

So far no tools of MSA are found. Recently Soundararajan[3] announced the discovery of some tools of this industry from a fine gravel deposit lying as a small terrace under thick deposits of loamy silt,[4] but he himself said that only a very few *in situ* gravel patches existed there and the other-called disturbed—were lying in 'depressions.' Hence the exact position of the *in situ* tools is doubtful. However, the illustrations and the presence of the fluted cores suggest that these belong to the microlithic industry—perhaps of the later period.

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1. Sen, D., Nalagarh Palaeolithic Culture, *M. I.*, 1955, Vol. 35, No. 3, pp. 180.
2. *Ibid.*, p. 181.
3. Sankalia, H. D., 1946, Investigations into Prehistoric Archaeology of Gujarat; Subbarao, B , 1952 ; Archaeological Explorations in the Mali Valley, JMSUB, Vol. 1, pp. 33-72.
4. Soundara Rajan, K.V , 1960, Middle Stone Age Sites from Khaira District in Gujarat, JORIB, Vol. X, pp. 167-179.

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The tools of this industry consisting points, borers, scrapers and flakes are found from Saurashtra.[1] Its stratigraphical position is similar to the other regions of the peninsular India. This industry may be correlated with the identical industry of the Upper Son Valley.

Microlithic industry of Gujarat

The southern part of Gujarat is partly formed by the recent alluvium of the rivers, while the northern and central are overlaid by a large deposit of wind-blown sands. This loamy plains contain hundreds of microlithic sites. Of these, one site was excavated by Sankalia between 1941-49 ; by Subbarao in 1953 and by K. A. R. Kennedy in 1963.[2] The microlithic deposit is divided into three periods. Period I deposit lies below the buried soil and contains microliths with most of the human skeletons, animal remains and a few potsherds. period II yields microliths in association with iron and modern pottery. The striking feature of this industry is the presence of a large number of animal bones and some human skeletons. Here "the makers of the microliths sat on a sand hill, much as was the case in so many microlithic sites all over the world."[3]

Our microlithic industry is purely non-geometric and devoid of pottery and hence it may be compared only with the identical tools of the Langhnaj industry.

RAJASTHAN

In north-west of Malwa and east of Gujarat is the State of Rajasthan. The country is divided into two parts by the Aravalli mountain range. The western part of the Aravalli is almost waterless country consisting of sands and stunted acacia, while the eastern part contains more hills and fertile lands.

In Eastern Rajasthan, the layers of gravel and silt form river cliffs. The evidence of second cycle's sedimentations was found at Bigod and half a mile downwards on the Banas and Chitorgarh on the Berach. In western Rajasthan, only the deposits of second cycle consisting of gravel and silt are found.

Typologically the Upper Son Valley is similar to the ESA industry found in Rajasthan. However, the number of handaxes and cleavers are more in this region, because of the abundant raw material. The notable element of ESA industry of this region is the

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1. Sankalia, H. D.
2. Sankalia, H. D., 1956, "The Microlithic Industry of Langhnaj, Gujarat," *JGRS.*, Vol. XVIII, No. 4, pp. 275-84 ; Sankalia, *op. cit.*, 1962, pp. 143-149 ; and some new information given by him.
3. Zeuner, F. E., 1952, "The microlithic industry of Langhnaj," *MAN*, Vol. LII, p. 129.
4. Misra, V. N., 1961, 'The Stone Age Cultures of Rajputana, Ph. D. Thesis, Copies in the libraries of the Deccan College and the Poona University—The author also had to visit Wagon and the Gambhiri and Berach rivers along with Dr. Sankalia in 1962.

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occurrence of the 'Levalloisian' flakes which do not form a part of the similar industry of our region. The other feature of this region is that handaxes and cleavers continued in the MSA industry. The rest tool-types of MSA of Rajasthan, namely scrapers, borers, borer-scrapers and points are similar to the tools of MSA of the Upper Son Valley. The microlithic industry of both the regions is non-geometric and devoid of pottery consisting of scrapers of various types, borers, points and blades.

MALWA

West of the Upper Son Valley and east of Gujarat is Malwa, where the river Chambal and its tributaries have been explored by Khatri.[1] Except at Nahargarh, the region provides similar stratigraphy. The collection made from here contains handaxes, cleavers, scrapers, choppers, chopping-tools—discoids, cores and flakes.[2] They have been classified into three groups which correspond to our three stages. But the notable feature of this industry is that all the flakes have simple platform.[3]

All the tool types, except point-cum-hollow scrapers, occurring in MSA industry of this region have their parallels, in the collection of the Upper Son Valley.

The Microliths of Malwa, called 'Pre Chalcolithic microliths' are non-geometric like the Upper Son Valley.

MADHYA PRADESH

In this State only the detailed results of two valleys have been Published.

Sonar Valley

R.V. Joshi surveyed the Sonar basin lying between 78° 45′ and 79° 39′ East Longitude and 24° 20′ and 23° 15′ North Latitude in Sagar and Damoh districts of Madhya Pradesh.[3] The river Sonar rises in the northern ridge of the Vindhyas and merges into the Ken, a southern affluent of the Yamuna. The rivers Ken and Son with their tributaries constitute the northern and southern drainage of the Vindhyas respectively.

Like the Upper Son Valley, this region also has the deposits of two cycles. The Abbevillian and Acheulian implements are found from the bouldery-pebbly gravel layer, but they have been divided into stages on the basis of rolling, weathering and technique. Abbevillian and Early Acheulian tools are rolled and therefore they are regarded earlier than the Acheulian tools. The industry of this region like the Upper Son Valley contains choppers, chopping tools, handaxe, ovates, cleavers and flakes. The faceted platform flakes are absent

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1. Sankalia, H. D. and Khatri, A. P., 1957, Stone Age Culture of Malwa, *JPSI*, Vol. 2, pp. 183-189.
   Khatri, A. P., 1957, Palaeolithic Industry of R. Shivna, *BDCRI*, Vol. 18, pp. 159-172.
2. —1958, Stone Age Cultures of Malwa (C. India), Ph. D. Thesis, copies in the libraries of Deccan College, Poona and Poona University.
3. Joshi, 1961, *op. cit.*, pp. 5-36.

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in this industry. Our tools of I, II and first phase of III are similar to the Abbevillian, Mid-Acheulian and Late Acheulian tools of the Sonar Valley. The tools of the second phase of Stage III do not have their parallel in the ESA industry of this region. In MSA industry, both the valleys have pronounced similarities with each other.

The tools of MSA consisting of scrapers, points and flake-blades from the deposit of fine sand and coarse silt from Churhat and Markandeya Bridge found by him are represented in our collection.

Narbada Valley

The Narbada rising on the summit of the Amarkantak plateau flows in a south-western direction, south of the Vindhyas. The stratigraphy and the Stone Age cultures of this river, specially between Jabalpur and Hoshangabad, have been examined by various scholars ; but so far no unanimous observations on the stratigraphy are available, obviously because of the complexity of the area.

De Terra divided the stratigraphy into three groups. The first group which rests on laterite consists of a gravel conglomerate and pink silt—the latter at the top. It is followed by the Upper Group constituting gravel and pink silt with an unconformity at the base. The third group is composed of fine gravel and b'ack soil.[1]

Khatri[2] pointed out that the conglomerate lay against the basal red greasy clay, but in a recent excavation carried out by Shri S.P. Supekar of the Deccan College, it has been found that the gravel does not rest against the red greasy clay but underlies it.

De Terra and Paterson found Abbevillian and Acheulian tools and flakes with prominent bulb, mostly highly rolled from the gravel conglomerate; and a few unrolled flakes and fresh Acheulian bifacial tools from the succeeding silt; and rolled flakes and most tools which go in 'late Soan industry' from both the deposits. The rolled Acheulian handaxes obtained from the gravel of the Upper Group are regarded to have come from the lower beds and redeposited here. The large flakes with prominent bulb are taken 'as the reminiscent of the Pre-Soan industry'[3] The beds of both the groups yield Middle Pleistocene fauna. However, the flakes coming from the basal gravel described by De terra seems to be 'a part of the same handaxe culture'[4] and the tools obtained from the gravel III are not identical with the artifacts of the Late Sohan.[5]

The flakes and tools of the first stage of the Upper Son Valley may be correlated with the tools of the basal gravel and the tools of Stage III with the Acheulian handaxes of

1. De Terra and Paterson, *op. cit* , pp. 313-326.
2. Khatri, A.P., 1961, Stone Age and Pleistocene Chronology of the Narmada Valley (Central India), *Anthropos*, Vol. 56, pp 519-530.
3. De Terra and Paterson, op. cit., p. 316
4. Sankalia, *op cit.*, 1962, p. 54.
5. *Ibid.*, p. 53.

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pebble gravel. The tools of MSA can be compared with the similar tools discovered from the chalcedony gravel.

UTTAR PRADESH

In the south-eastern part of this province is the district of Mirzapur where the flat alluvial plains caused by the Ganges and its tributaries by washing the Himalayas are met with the formations of the Vindhyans. Its southern part, which comes in the mid-valley of the river Son was examined by Zeuner and his party.

Southern part of Mirzapur

Like the upper part, the mid-part of the Son Valley[1] reveals deposits of two cycles. The bottom gravel contains the tools of ESA, but unlike the upper part, the succeeding gravel is unimplementiferous, where it yields tools of MSA. The notable factor is that no tool of this cultural phase is found from this area. However, nearly all the tool-types of the Singrauli basin have their parallels in its upper part ; the 'true Levalloisian flake' of the ESA of this area does not occur in our collection.

The microliths, devoid of pottery, were found four feet below the Upper alluvium made mainly of quartz along the southern bank of Balia nadi near Kota unlike our area where they are predominantly made of chert. In the Upper Son Valley, they occur an open surface of river banks and hills except at one place Kusarwar on the bank of Chundi nadi embedded in the alluvium deposit. Except backed blades and lunates, all the tool types of this industry occur in our collection. The various types of scrapers of the microlithic industry of the Upper Son Valley are not found from this part. However, the microlithic industry of our region seems to be contemporary with that of Mirzapur.

BIHAR

Southwards, part of Bihar has the well-known Chota Nagpur plateau consisting of the rocks of Archaean period occasionally meeting with the formations of Lower and Upper Gondwana formations. On its southern fringe is the district of Singhbhum.

Singhbhum

This district is entirely covered by the Archaean rocks consisting of quartzite, quartzitic sandstone, jasper etc. and three small outcrops of granitic genesis, two in the east and one in the south. Laterite occurs in many places.

D. Sen and one of his pupils explored Chaibasa and its neighbourhood.[2] On the left bank of Raro, a tributary of Kharkai, they located three terraces at the hights of 60 ft., 40 ft., and 20 ft. respectively.

The last terrace is younger one made of recent alluvium, but both the former are old

1. Krishnaswami, V.D., and Sundara Rajan K.V., *op. cit.*, 1951, pp. 40-65.
2. Sen, D. and Ghosh, A.K., 1960, on the occurrence of Palaeoliths in Singhbhum, *M.I*, Vol. 40, No. 3, pp. 178-191.

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and covered by gravels. The surface of the top terrace at places is covered by a thin layer of yellow soil and an underlying layer of murum. Mostly the tools are obtained from the top terrace, but a few from the second and third terrace which are rolled and weathered. They went further to check up the stratigraphy, visited a quarry which exhibited the following succession :—

1. Yellow sandy soil
2. Red murum soil
3. Smaller gravel bed
4. Boulder bed
5. Steatite bed

The industry revealed by them includes chopper, chopping-tool, scraper, cleavers and Abbeville and Acheulian handaxes. The latter can be compared with the Early Stone Age tools of Upper Son Valley.

Monghyr

In 1959, N.K. Bose and others discovered six ESA tools from the surface near Bhimbandh in this district.[1] The line drawings and descriptions of the tools indicate their resemblance with some of the tools of ESA of the Upper Son Valley.

WEST BENGAL

The district of Bankura in West Bengal is the meeting place of the plains on the east and the Chota Nagpur plateau on the west. D. Sen and his team explored this district.[2] It is divided into two parts. The first consists Dwarakeswar Valley and the other kasai.

Dwarakeswar Valley

In this Valley, ESA tools are found from the detrital laterite with gravels which rests on the bedrock and capped by recent soils. At no place in the river-cliffs of the Upper Son Valley, the laterite or detrital laterite occur, and therefore the tools of ESA come from the cemented or slightly consolidated coarse gravels.

Kasai Valley

More or less the same picture is seen in this part. The detrital laterite, in some places, is overlaid by a thin layer of unimplimentiferous gravels in ferruginous matrix and in turn followed by a yellowish loamy soil.

Purulia

Krishnaswami claims to have discovered some tools of MSA from the Kasai Valley in this district, but Sankalia who personally saw this collection, thinks that they belong more to the microlithic tradition.

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1. Bose, N.K. 1960, Palaeoliths from Monghyr District, Bihar. *M.I.*, Vol. 40, pp. 68-75
2. Sen D., Ghosh, A.K. and Chatterjee, M., 1963, Palaeolithic Industry of Bankura, West Bengal, *M.I.* Vol. 43, No. 2, pp. 100-118.

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The microlithic industry of this region is basically geometric and hence it is uncomparable with the industry of the Upper Son Valley.

Burdwan

The Chota Nagpur plateau extends into the west of Burdwan district. Here, near the Durgapur Railway Station at Birbhanpur, one small excavation was done by B B. Lal which revealed a microlithic site. The top of the layer consisting of lateritic gravel with stone fragments was like the land surface over which the microlithic man lived. The second layer consisting of earth mixed with coarse granules yielded the microliths-the main bulk came from the lower part of this deposit—and in turn followed by another layer of sandy light brown earth.

This industry is regarded as non-geometric because of the absence of typical geometric forms like triangles and trapezes. Like Mirzapur microlithic industry, the industry of this place is mostly on quartz, but in the Upper Son Valley the main raw material used for this industry is chert. The use of quartz in the microlithic industries of Mirzapur and Birbhanpur seems to be responsible for the poor workmanship of the tools. Whether this represents an altogether different tradition from the microliths of the Upper Son Valley, or whether it should be attributed to the new material remains to be investigated.

However, except lunates, all the tool types of this industry occur in the similar collection of the Upper Son Valley.

ORISSA

In the southeast of our region lies the State of Orissa Here, from 1939 onwards, N.K. Bose and his colleagues made Kuliyana their centre of investigation, in the district of Mayurbhanj.[1] From the laterite pits, locally known as *gusi kadanh*, a large number of artifacts were taken out and many implements encrusted with laterite matrix lay on the surface. The latter in fact were derived from the underlying laterite. The Kuliana industry "is mainly a core-industry with an important addition of pebbles and small admixture of flakes with high flaking angle and prepared or unifaceted striking platforms.' Most of the handaxes, except a few which are Acheulian' are made by 'block-on-block' or 'Stone hammer' technique. From the boulder-conglomerate lying over clay or laterite and capped by a huge deposit of alluvium, the crude pebble tools and bifaces were obtained. "These are comparable with the so-called pebble tools and may be said to belong to the same facies as the pebble tools from our river sections and those from Africa or elsewhere."

Afterwards a more extensive survey was made by Mohapatra. The results have been recently published.[2] He has established the succession of three cycles. The ESA tools

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1. Bose, N.K. and Sen, D. 1948, Excavations in Mayurbhanj Bose N.K., Sen D. and Ray C., 1958, Geological and Cultural Evidences of the Stone Age in Mayurbhanj, *M.I.*, Vol. 38, pp. 49-55.
2. Mohapatra, G.C., 1962. The Stone Age Cultures of Orissa.

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came from the coarse gravel layer and the detrital laterite, while the tools of MSA come from the fine gravel layer assigned to second and third wet phases respectively.

In the Upper Son Valley the tools are not found from the laterite ; however, the first and second gravels yield, like Orissa, the tools of ESA and MSA. Both the regions represent the tools made by 'block-on-block' or 'stonehammer' technique, and the later evolved 'cylinderhammer' technique. No chopper or chopping tool occurs in Mohapatra's collection. However, unlike the Upper Valley of the Son, cleavers and handaxes are in abundance. In Orissa, "there is no evidence to show that the authors of this culture know the making of prepared platform flakes." This technique ended there in the succeeding culture. Except burins, all the tool types of Orissa are represented in our collection. One handaxe was found from the second gravel associated with MSA tools, which the author thinks as a "luxury" or fun for the people of the MSA.

The collection of microliths from Orissa is very small and therefore they do not represent the various types of scrapers as are seen in our collection. Backed-blades and burins of this industry are not found from the Upper Son Valley. The remarkable feature is that both the industries are non-geometric and devoid of pottery.

ANDHRA

Andhra Pradesh which lies to the south of Orissa provides the relics of Stone Age from three of its districts, Kurnool, Guntur and Nellore. The former has been fully explored by Isaac.[1]

Isaac located three gravels each followed by silt, in this district.

Kurnool

The tools of the ESA come from river gravels as well as detrital laterite. The remarkable laterite. feature of the ESA industry of this district is the pebble tools which form about 40% of the total collection. Isaac has divided the tools of this region into three stages like the Upper Son Valley. Series II tools of this district can be compared with the tools of the MSA, but Series III is unparalleled as it corresponds to the Upper Palaeolithic culture. The microlithic industry of this area consists of geometric and non-geometric shapes.

Guntur

In the district of Guntur two valleys, Krishna at Nargarjunakonda and Naguleru near Karempadi were investigated.

Krishna Valley

K.V. Soundarajan[2] discovered three tools *in situ*, one from the third gravel and the

1. Isaac N., 1960, The Stone Age Cultures of Kurnool, Ph. D. Thesis, copies in the Libraries of Deccan College and Poona University.
2. Soundarajan, K.V., 1958, Studies in the Stone Age of Nagarjunakonda and its Neighbourhood, *A.I.*, No. 14, pp. 49-113.

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rest two from the 'lowest gravel or the next.' About the exact location of these two tools, he has left us in the dark.

In his paper a picture of only two cultures—Lower Palaeolithic and Upper Palaeolithic is presented and not of the Middle Palaeolithic. Moreover, the tools assigned to the Upper Palaeolithic are surface-finds and, therefore, they may be rightly transferred to the Middle and the Late Stone Ages.

The Abbevillian handaxes, pebble tools and Clactonian flakes of Nagarjunakonda may correspond to our Stage I tools. Neater artifacts with a thinner section showing the second step of development may harmonize with the tools of Stage II. The tools of Stage III may be correlated with the advanced Acheulian tools. No true Levalloisian flake is found from the Upper Son. Some tools of the Upper Palaeolithic of this place may be compared with our MSA tools. Like the Upper Son industry, the microliths of Nagarjunakonda are non-geometric[1] and except burins and backed blakes, all the types are represented in our collection.

Nellore

Frank P. Manley of the American Baptist Telugu Mission collected tools from Nellore district and on his invitation, F. H. Gravely and A. Aiyappan visited various sites of this district. The latter compiled the result of his stratigraphical investigation and typological examination.[2]

Most of the tools are found from the hill slopes, fields and forests and others from the gravel layer, and mud bank of the streams clay pits, bed of a tank yielding laterite and laterite gravel pits But we do not know whether the tools discovered *in situ* were from the loose laterite or hard laterite and further the lateritic matrix on the surface of the tools may not prove their existence in *in situ* laterite or primary laterite.

The classification of the tools has been done on the nature of patination. In classifying the tools of the ESA of the Upper Son Valley, only the techniques are considered, as the division on the basis of patination is not often dependable.

The industry consists of choppers, chopping tools, discoids, Abbevillian and Acheulian handaxes, cleavers and scrapers. These tools may be compared with the similar tools of the ESA of the Upper Son Valley.

Since the blades, burins, awls and some scrapers are found from the surface, it is difficult to place them in an exact chronological place.

MADRAS

Around Madras, Paterson[3] and Krishnaswami[4] worked to exhibit the picture of Stone

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1. Nos. 5 to 7 are described as 'crescentic tools,' but as the illustrations show, they do not have the form of a crescent.
2. Aiyappan, A., The Manley Collection of Stone Age Tools, *M. A. S I*, No. 68.
3. De Terra and Paterson, *op. cit.*, 1939, pp. 327-330.
4. Krishnaswami, V. D., 1938, Environmental and Cultural changes of Prehistoric Man near Madras, *GMCA*, Vol. XIII, No. I, pp. 58-90.

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Age Cultures. Here the primary laterite was cut by rivers and covered by boulder conglomerate and the latter in turn was capped by detrital laterite. This horizon was eroded and the result was the formation of three terraces at Vadamadurai. The tools of first group consisting of Abbevillo-Acheulian tools are said to have come from the boulder conglomerate, while the mid-Acheulian were found from the succeeding laterite deposit and the Late Acheulian from the post-laterite horizon.

At Attrampakkam a large number of Acheulian handaxes is claimed to have been discovered from the basal laterite gravels of terrace two. A few cores and flakes which are fresh were discovered from the overlying silt layer. The Vaal technique of South Africa is observed in the cleavers made on flakes showing parallelogram section. The Levalloisian like flakes having faceted platform and much primary flaking on the upper surface were picked up from the top of the loam.

The handaxes of the Upper Son Valley grouped into three stages correspond to the similar classification of the Madras industry. One cleaver of our collection shows Vaal technique ; the rest may be similar to the U—and V-shaped cleavers found from these localities. However, no 'Levalloisian flake' occurs in our collection.

Tinnevelly Microlithic Industry

The microlithic industry of this place is studied by Zeuner and Allchin and the former presents a geological picture of this region, in relation to the microlithic industry.[1]

During the dry climate when the sea level was nearly 20 to 30 ft. higher than at present, because of wind activity *teris* or sand-dunes and lagoons were formed and microlithic people occupied them. 'Following the formation of dune-sand and lagoons, weathering occurred and this was followed by a second phase of wind-activity. The latter may be equated with the recent or sub-recent phase, which is also represented by the modern lagoon. Between it and the earlier phase, therefore the weathering intervened, and it corresponds thus to a drop of the sea-level from 20 ft. to zero, or even to a negative oscillation."[2]

Except Kulather industry, which is geometric, the microliths of other sites are heavily patinated and hence called Tinnevelley Teri Industry. This industry is tentatively dated 4000 B. C., hoping to take it back into the Pleistocene by further scientific research.

The industry includes blade-flakes, blades, backed blades, obliquely blunted blades, hollow-scrapers, concave-scrapers, side-scrapers, end-scrapers, thumbnail scrapers, simple points, asymmetrical points, unifacial points, bifacial points, lunates, transverse arrowheads, triangles, chopping-tools and cores.

The microlithic collection of the Upper Son Valley exhibits points, borers, borer-scrapers, various types of scrapers, simple and used blades, flakes, fluted and simple cores,

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1. Zeuner, F. E. and Allchin, Bridget, 1956, The Microlithic Sites of Tinnevelley District, Madras State, *A. I.*, 12, pp. 4-20.
2. *Ibid.*

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but not lunates. However, the Tinnevely industry appears to have been more advanced than the Upper Son.

MYSORE

Mysore has been explored at some places.

Malaprabha basin

This valley was systematically surveyed by Joshi.[1] The main raw material is fine grained quartzite of various colours. The collection consists of Abbevillian, Acheulian tools and a few Levalloisian flakes. The Acheulian tools are in a majority. The Abbevillian and Acheulian artifacts closely resemble our tools of Stage I and III. The artifacts showing deep and shallow scars of the Malaprabha valley may be compared with the tools of Stage II of the Upper Son Valley. The Levalloisian flakes do not have their parallel in our collection. Unlike the Upper Son Valley, the cleavers are found from the region in good number. No cleaver of the Upper Son Valley has concave edge. The high percentage of well-trimmed handaxes and cleavers and the presence of the Levalloisian flakes, in spite of the occurrence of huge cores, choppers, core-scrapers and discoids of the Malaprabha industry appears more advanced than the Upper Son Valley industry.

Kibbanahalli

From this place in the district of Tumkur, a palacolithic industry has been reported by Seshadri. It contains a collection of diverse elements such as Abbevillian and Acheulian handaxes, cleavers, choppers and chopping tools of the ESA along with side and hollow scrapers, points and blades of the MSA[2]—the latter might be a re-deposit. All these tools can be compared with the tools of ESA and MSA of the Upper Son Valley.

MSA Industry

In 1956, Seshadri held that 'the microlithic period must be regarded as an immediate successor to the vast period of industries of Lower Palacolithic aspect.'[3] But in the next year an intervening culture between the Lower Palacolithic and the Microlithic was revealed by Banerjee from North Karnatak which we call "Karnatak Nevasian."[4] Again in 1960-61 the tools of this industry were discovered from Bijapur district.[5] These include points, scrapers, borers, cores and flakes as in the Upper Son Valley.

Bellary

Recently Sankalia and his colleagues carried out excavations at Sanganakal[6] with a

1. Joshi, R. V., 1955, Pleistocane Studies in the Malaprabha Basin.
2. Seshadri, M., 1955, The Palacolithic Industry of Kibbanahalli, Mysore State, *AA.*, Vol. XVIII, pp. 271-87.
3. Seshadri, M., 1956, The Stone-using Culture of Prehistoric Mysore, p. 218.
4. Banerjee, *op. cit.*, 1957, pp. 218-260.
5. *IAR.*, 1960-61, p. 64.
6. Sankalia, H. D., 1965, Prehistoric Migrations in South India, The Times of India, Feb. 28.

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view to re-examining the earliest phase yielding microliths of quartz along with patinated trap flakes revealed from a small excavation of Subbarao on the Sannarasamma hill.[1]

Under the neolithic habitation they found two cultural horizons ; one from blackish soil consisted of scrapers, lunates, cores and flakes of chert and quartz and the other a reddish murrum formed by disintegrated granite. In this layer were choppers, cores, flakes and blades of basalt. Sankalia feels that the earlier industry 'resembles in technique and type the tools made by the Early and Middle Stone Age men" However, the occurrence of the blades takes this industry nearer to the MSA rather than ESA.

So far there is nothing in the Upper Son Valley to compare with the stratigraphical and cultural manifestation.

Jalahalli Microlithic Industry

Todd in 1946 collected microliths from the surface of the hill. He also got some microliths below a layer of black soil in a reddish murrum described by him as 'pellatic laterite.'[2] As in Bellary, this layer also seems to be disintegrated granite.

This industry includes points, triangles, lunates, transverse arrowhead, burins, scrapers and flakes. Except burins and lunates all the tool-types are represented in the microlithic industry of the Upper Son Valley.

MAHARASHTRA

Geographically this State is divided into two parts, the Deccan plateau and the Konkan. The former contains rich relics of Stone Age Cultures.

Deccan Plateau

The Godavary Basin.

The Deccan Plateau, which is formed by the lava, was inhabited by Early Man is testified by finds from Nasik, Akola and Nevasa.

At Gangapur[3] near Nasik in the upper reaches of the Godavari the brownish clay is laid over the basal rock because of the presence of hollows there. On this layer, two gravels and silts rest as in the Upper Son Valley.

At Akola and Vite which are also in the higher reaches of its tributary, the Pravara, a thick deposit of rubble-like gravel directly lies over the basel rock and is in turn capped by silt.[4] However, these deposits belong to first aggradational cycle which is equivalent to first two deposits—the first gravel and silt—of our region.

The Pravara was further examined at Nevasa where three gravels and two silts were

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1. Subbarao, B., 1948, Stone Age Cultures of Bellary.
2. Todd, K.R.O., 1948, "A Microlithic Industry in Eastern Mysore," *Man*, March, Vol. XLVIII, pp. 28-30
3. Sankalia, op. cit., 1962, pp. 43-44 ; *IAR*, 1959-60, pp. 29-30
4. Sankalia and others, *op. cit.*, 1960, p. 528

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found in a section near Hathi (Elephant) well. The gravel I yielded the tools of ESA and gravel II and III tools of MSA which were called Series II by Sankalia.[1] As there is no intervening layer between gravel II and III and the latter deposit is much finer in nature, R. V. Joshi thinks that possibly they represent one cycle of aggradation with coarser facies at the bottom.'[2] Hence the gravel I and gravels II-III may be compared with gravels first and second of the Upper Son Valley.

The Godavari industries are well dated on palaeontological evidences. The earliest culture which comes from the first gravel along with the fossil of *Bos namadicus* is placed in the Mid-Pleistocene, while its succeeding culture – MSA from the gravel II being associated with the fossil of Bos *namadicus* Falconer of the same period but regarded as a survival of the species as 'in a horizon a new age is heralded," is assigned to the Upper Pleistocene.[3]

At Gangapur, cleavers, flakes, scrapers, chopping and chopping-tools along with a few highly advanced Acheulian tools were discovered from the 'top of the lower-most reddish clay, at the junction of the clay and overlying gravel and in the gravel itself.''[4]

The flakes showing essentially bifacial working predominate in this industry. The cleavers of all types are found in good number. The side scrapers and choppers obtained from here are considered as a 'special feature of the Godavari industry.'[5] A few handaxes along with hammerstones or round balls are also found.[6] The latter is notable for its non-occurrence in the other collections of India, except Bina in the district of Sagar.[7] These have been also found from an excavated site in Northern Rhodesia, Africa.[8] No such specimen is found from the Upper Son Valley. The tools of all the three stages of the Upper Son Valley have their parallels in the collection of this valley.

The tools of MSA discovered from this region, named 'Nevasian' by K.D. Benerjee,[9] are represented in our industry. The Microliths consisting of fluted and irregular cores, parallel sided blades and scrapers, except lunates,[10] observe the similarity with the microliths of the Upper Son Valley.

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1. Sankalia *op. cit.*, 1956, pp. 35-52.
   Sankalia and others, op. cit., 1960.
2. Joshi, *op. cit.*, 1961, p. 21.
3. Sankalia and others, *op. cit.*, 1960, p. 105.
4. *IAR*, 1959-60, pp. 29-30.
5. Sankalia, H.D., 1952, The Godavari Palaeolithic Industry, p. 12.
6. Sankalia and others, *op. cit.*, 1960, pp. 76-101.
7. Sankalia, *op. cit.*, 1962, p. 45.
8. Clark, J D., 1959, Further Excavations at Broken Hill, Northern Rhodesia *JRAI*, Vol. 89, pp. 208-10.
9. Banerjee, K.D, 1957, The Middle Palaeolithic Industries of the Deccan, Ph.D. Thesis, copies in the libraries of Deccan College and Poona University.
10. Sankalia and others, *op. cit.*, 1960, p. 528; Sankalia, *op. cit.*, 1962 p. 140; IAR, 1949-60, p. 29.

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Other rivers

The other rivers of the Deccan plateau as the Mula at Poona,[1] the Bhima at Pandharpur,[2] Sholapur district, the Tapti in the West Khandesh district[3] and the Wardha in Chanda district[4] repeat more or less the same history noticed at Gangapur and Nevasa. The striking characteristic of these streams is that their collections contain mostly cleavers, unlike the Upper Son Valley.

Konkan Bombay Area

From 1949 to 1960, at least thrice Sankalia visited Bombay area round Borivili and Khandivili and in a nala at Khandavili, noticed two sections composed of two main deposits, showing from bottom upwards : cemented gravel and silt—sand and gravel—a re-wash on the top. However, no tools of ESA were found from this area ; the tools discovered from the basal gravel under the bridge, the overyling silt and sand, and the rubble gravel and its junction with the top humus or blackish soil, really come in the succeeding culture.[5] The tools of this industry, except burins on the basis of raw materials and technique, can be correlated with the same industry of the Upper Son Valley.

Geometric but predominantly non-geometric microliths are found from Bombay[6] and Satara districts.[7] Except burins, backed blades and geometric shaped microliths, all the toll types are represented in our collection.[8] The introduction of micro-burin and geometric microliths is believed to be later.

(II) OUTSIDE INDIA

Only the typo-technological correlation of the Upper Son Valley's industries is made with similar industries outside India.

EAST AFRICA

Here the earliest unquestioned stone industry comes from the Bed I of the Oldoway (Olduvai) Gorge dated to the Upper part of the Lower Pleistocene.[9] It is characterized by pebble-tools[10] worked bifacially along one side to produce a sharp, irregular and jagged

1. *IAR*, 1957-58, p. 67.
2. *Ibid*, 1956-57, p. 78.
3. *Ibid*, 1958-59, p 24.
4. *Ibid.*, 1960-61, p. 22.
5. Sankalia, H.D., 1959-60, Stone Age Cultures of Bombay—A reappraisal, *JAS*, Bombay (New Series), Vol. 34-35, pp. 120-131.
6. Todd, K.R.U., 1950, The Microlithic Industries of Bombay, *AI*. No.-6, pp. 4-11.
7. Malik, S.C., 1959, Stone Age Industries of the Bombay and Satara Districts, pp. 23-26.
8. Todd, *op. cit.*, 1959, p. 9.
9. Oakley, *op. cit.*, 1964, p. 173 ; Leakey L. S. B., 1965, Olduvai Gorge, Vol. I, p. 3.
10. Leakey, L. S. B., 1951, Olduvai Gorge, pp. 34 37.

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cutting edge. Besides a small number of unifacial flat-based tools also occur. These tools belong to the pre-handaxe phase. But in the Upper Son Valley the pebble tools are associated with the handaxes. Hence no comparison of the pebble tools of the Upper Son Valley with those of Olduvai can be made. Here it may also be pointed out that the Olduvai pebble-tools are credited to give birth to Chelian Culture, but as the pebble tools in our region are found along with the handaxes and other tool-types, this phenomenon has not much significance.

Olduvai presents us with a unique development in well-marked stages of the Chelles-Acheul Culture.

Stage I discovered from the junction of the top of Bed I and the base of Bed II and also the lowest level of Bed II itself yielded 50% evolutionary advance tools—crude, and simple handaxes.[1] The second stage recovered from 10-15 ft. above the base of Bed II represented handaxes with thick, massive butts and a marked flattening on the lower face[2]—they are really known restrocarinates.[3] Stage III was noticed 20 ft. above Stage 2, revealing new characters ; large and thick handaxes, "More or less triangular but sometimes roughly oval in outline when viewed from above. The lower face is remarkably flat—due to careful flaking which usually extends over the whole inferior face."[4] The handaxes of these stages can be compared with the handaxes of Stage I of Upper Son Valley.

Stage 4 and 5 are regarded as transitional between the Chellean and Acheulian, coming 10 ft. below the junction of Bed II and III and the junction of both the beds respectively. The handaxes of stage 4 have commonly a cutting edge all round, flatter lower surface than the upper, so that the cutting edge when viewed from the side is not central, but is much nearer to the lower than the upper face."[5] The stage 5 represents the same characteristics, except a few tools made by 'cylinder-hammer technique.' Our tools of Stage II are similar with the Stage 4 and 5 of the Olduvai because they also belong to the transitional phase. Tools discovered from various levels of Bed III are classed as Stage 6. Here are cleavers were first introduced. The handaxes "display a very developed form of the cylinder-hammer technique, comparable to some of the finest Acheulian flaking in Europe."[6] The Stage 7 discovered from the base of Bed IV "is distinguished[7] from all the previous ones by the presence of a high proportion of very large, well made handaxes, which are in most cases much wider in proportion to their length than the more ordinary types. Cleavers too are relatively common and in nearly all cases are slightly narrower at the

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1. Leakey, 1951, *op cit.*, pp. 41-48.
2. *Ibid.*, pp. 40-56.
3. Cole S., 1963, The Prehistory of East Africa, p. 139.
4. Leakey (1951), *op. cit.*, p. 56.
5. Leakey (1951), *op. cit.*, p. 73.
6. *Ibid.*, pp. 78-86.
7. *Ibid.*, p. 95.

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cutting edge than in the middle and have a biconvex and not a parallelogram section."[1] The characteristic features of Stage 8 are that the tools are smaller than the earlier ones, cleavers are in the form of a V rather than a 'U' with their widest point at the cutting edge along with S-twist ovates[2] The latter type is not present in the Upper Son Valley. However, in consideration of "Afro-Asian correlation, it is worth noting that cleavers with parallelogramic cross-section made their African appearance in the same stage at Olduvai" (i.e., Stage VIII).[3] The occurrence of cleavers in the Upper Son Valley in India suggests "the direct spread of Acheulian tradition from Africa into India."[4] The cleavers in East Africa occur in Bed IV which is placed in the upper part of the middle Pleistocene.[5] Hence it might be held that in India the ESA culture came in this or after this period. Some tools of Stage III of the Upper Son Valley are similar to the tools of Stage VII and VIII of the Olduvai.

Stage IX is generally similar to Stage VII with the adoptation of 'S' twist of the Stage VIII. The next stage—Stage X—marked the climax of the Acheulian Culture.[6] However, the last stage (Stage 11) recalls the Fauresmith culture.[7] A few tools of the Stage III of the Upper Son Valley can be compared with some of the tools of these stages (IX—XI). The remarkable difference between the Upper Son Valley and East Africa is bolas stones which occur in almost all the stages of Olduvai industry, but are so far not noted from many sites in India.

In the First Intermedial Period which commenced after the end of Abbevillio-Acheulian Culture, various industries originated or developed. Fauresmith flourished during the drier period preceding the Gamblian pluvial in Kenya and Ethiopia. It includes small handaxes, cleavers, numerous stone balls, flake tools with faceted flat forms, scrapers and chisel.[8] Another contemporary[9] culture, Sangoan—a forest and wood land culture originated from the combination of biface and faceted-platform technique[10]—got the name after the discovery of a site in the hills above Sango Bay, Uganda, on the western side of Lake Victoria.[11] The main feature of this industry is that it includes picks instead of cleavers of Fauresmith. It also spread in the basins of great rivers such as Congo and Zambezi.[12]

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1. Leakey (1951), *op. cit.*, p. 106.
2. *Ibid.*, pp. 117-120.
3. Oakley, *op. cit*, 1964, p. 180.
4. *Ibid.*, p. 224.
5. Leakey, *op. cit.*, 1965, p. 43.
6. Leakey, *op. cit.*, 1951, pp. 129-131.
7. *Ibid*, p. 143.
8. Cole, 1963, p. 184.
9. *Ibid.*, p. 185.
10. *Ibid*, p. 183.
11. Lowe, 1952, *op. cit*, pp. 28 ff.
12. Cole, *op. cit.*, p. 186

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The Levalloisian culture which flourished in the whole of the Horn is divided into Lower and Upper.

The Lower is dated to the decline of the second Gambian peak, while the upper to the decline of the third Gamblian peak. The former consists of prepared cores, faceted flakes and flake blades, with a very few scrapers and points and some "trimming stones" or core scrapers. In the 'upper', the same characteristics are noticed except generally smaller prepared flakes. It also extended into Sudan, between Nuri and Dongola and Abu Tabasi Well.[1] The Proto-Stillbay industries might be renamed Lower Still bay[2] evolved out of 'Developed Levalloisian.'[3] At the same time another industry, contemporary with the Lower Levalloisian, developed, called Pseude-Still bay. This industry includes small points made from flakes with faceted platform (not made by pressure flaking seen in the Still bay) with secondary retouch on one side of the point. Retouch on both the surfaces are very rare,[4] while they are common in Proto-Still bay. This Proto-Still bay was followed by a true Still bay industry. The Lupemban culture also occurs here.[5] The industry placed in Second Intermediate is Magosian, having many microlithic implements, beads of ostrich egg-shells and pottery which appear in the later stage.[6] However, these industries are characterized by highly well made tools and therefore cannot be compared with the tools of Later Stone Ages.

SOUTH AFRICA

In South Africa the well dated sequence of the Pre-Chelles-Acheulian Culture is recorded in the river Vaal at Harrisdale and Kaliptan.[7] Though tools were found from the cemented basal older gravels assigned to the end of the Kageran pluvial but the developed Kafuan or Oldowan's artifacts were obtained from the older gravels being extended from 300 to 50 above the river dated to the Kamasian Pluvial.[8] The chopper-chopping assemblage of the Son Valley can be well compared with the tools of these industries.

Succeeding these industries, the tools of Chelles-Acheulian Cultures were discovered from the younger gravels called Vall I-V. The Stage I is the Chellian or Abbevillian phase ; Stage II marks the transitional phase from Abbevillian to Acheulian. Our tools of I Stage can be compared with Vall I, while the second with Vall II The Acheulian culture in South Africa starts from Stage III of Vaal, exhibiting fine handaxes and cleavers. In Stage IV,

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1. Cole, *op cit* , p. 195.
2. *Ibid.*, p. 196.
3. *Ibid.*, pp. 196-7.
4. *Ibid.*, p. 197.
5. *Ibid* , pp. 200 ff.
6. *Ibid.*, p. 206.
7. Clark J. D., The Prehistory of Southern Africa, A Polican Book, 1959, 115-16.
8. *Ibid* , pp. 117-128.

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only the Proto-Levallois of Stage III or 'prepared core' technique developed. The last stage, Vaal V dated to the very end of Kanjeran times forms the climax of Acheulian culture increasing the finished flake tools in number. Stage III of Upper Son can be compared with the Acheulian industry of South Africa.

In between the Acheulian and Middle Stone Age, two cultures called Fauresmith and Sanoan flourished, ranging from Kanjeran—Gamblian Inter-pluvial to earlier part of the Gamblian pluvial. The former extended into the open country, grassland and high plateau of southern part, while the latter in the forested part—the northern part. The tools of Fauresmith culture are smaller than in the previous industries and were made by 'step-flaking' done by hammerstone or anvil. The industry of the Sangoan exhibits crude, heavy picks, handaxes, pebble choppers, points and parallel sided 'usequx' (chisels) etc.[1] The technique of step-flaking is also seen on the tools of Upper Son Valley.

In the Middle Stone Age various cultures or variants, namely Lupemban, Pietersburg, Mazelspoort, Alexanderstontien, Still bay, Mossel Bay and Rhodesian Still Bay existed. However, these variants having specialised tools, such as smaller picks, handaxes, chisel, handaxes, boat-shaped planing tools, tranchet and scrapers[2] are quite dissimilar from the tools of Upper Son Valley.

The Late Stone Age with four cultures or variants known as Tshitolian,[3] Nachi Kutan[4] and Wilton[5] and Smithfield[6] consists of very well made microliths associated with pottery and sometimes with polished implements is not comparable with the Late Stone Age Industries of the Upper Son.

NORTH AFRICA

Prehistoric Man's oldest settlement is located in North Africa at Ain Hanech, near St. Arnaud in Algeria. The finds consist of cores seen in Clactonian industry.[7]

The other site known as Lake Karar in Oran Province belonging to Early Middle Pleistocene, exhibits handaxes including finished lancedate forms cleavers and flakes. The latter also has small points and side-scrapers.[8] At Palika in the gravel pit of Ternifine similar industry was brought to notice.[9] In the deposit made at the bank of a spring at Sidi

1. Clark J. D . The Prehistory of Southern Africa, A Pelican Book, 1959, 142-152.
2. Clark J. D , The Prehistory of Southern Africa, A Pelican Book, 1959, 153-165.
3. *Ibid.*, pp. 190-193.
4. *Ibid.*, pp. 193-199.
5. *Ibid.*, pp. 199-204.
6. *Ibid.*, pp 204 ff
7. McBurney, C. B. M , The Stone Age of Northern Africa, A Pelican Book, pp. 94-5.
8. McBurney, C.B.M., The Stone Age of Northern Africa, A Pelican Book, pp. 97-98
9. *Ibid* , pp. 99-101

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Zin, four layers were recognised yielding cultural remains from bottom upwards; handaxes better than at Karar, scrapers and chopping tools made on pebbles; handaxes predominantly unifacial and cleavers similar to the first horizon; and lastly handaxes and the introduction of prepared core technique.[1]

In North Morocco near Casablanca a notable discovery of Lower Palacolithic relics was made in a quarry at Sidi Abderrahaman which was dug in the marine deposits. The first industry which was handaxe, was located above the high-water line, while the beach was in formation. The overlaid terrestrial and fresh water deposits yielded a core and a few flakes. At the height of 28 and 30 m from the present sea level, an industry consisting of handaxes of pear-shaped to cordiform some manufactured by seft hammer technique with U-shaped cleaver made on flakes calling 'Proto-Levalloisian' is recorded. The third industry which occurred in the caves comprises highly evolved handaxes being cordiform or oval, sometimes twisted with evolved Levalloisian flakes.[2]

The Upper Son Valley does not present such an industrial development ; however, some of its artifacts, disregarding for a moment their exact age, might be compared with similar tools from Northern Africa.

The Middle Palacolithic sites of Northern Africa (excluding Egypt) of worth mentioning are Wadi Derna,[3] cave of Hana Fateah.[4] The development of this industry called Atenan is also seen in Atlas Massif.[5] It is characterized by Levalloiso-Mousterian techniques and hence cannot be compared with our industries in the Son basin.

EGYPT

The investigation in prehistoric archaeology made in Egypt.[6] The earliest artifacts were located in the gravels of 100 ft. terrace. This industry is Chellian. The terrace 50 ft. above the modern alluvium contains on its gravels the rolled Chellian along with slightly rolled Acheulian tool, both of them were likely contemporary.[7] These deposits are correlated with '30 m' level of the Great-interglacial.[8] The handaxes of all the three stage of Upper Son Valley can be compared with the Ehellian and Acheulian tools of Egypt.

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1. *Ibid.*, pp. 103-108
2. McBurney, C.B.M., The Stone Age of Northern Africa, A Pelican Book, pp. 114-119
3. *Ibid.*, p. 167
4. *Ibid.*, pp 168 ff.
5. *Ibid.*, pp. 177 ff.
6. Sandford K.S. and Arkell W.J., 1933, Palacolithic Man and the Nile Valley in Nubia and Upper Egypt. Sandford K.S., 1934, Palacolithic Man and the Nile Valley in Upper and Middle Egypt.
7. Sandford and Arkell, *op. cit.*, p. 25
8. McBurney (1960), *op. cit.*, p. 129

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The Middle Palacolithic industries were discovered from the four horizons—30 ft. terrace in Upper Egypt and Nubia, 10-15 feet terrace in Middle Egypt, 25 ft. terrace in Lower Egypt and silt at Kom Ombo and Fayum The terraces of 25 and 10-15 feet either might be contemporary or the former may belong to the late last Interglacial.[1] In the terrace 30 feet of upper and Middle Egypt the handaxe iudustry with a somewhat rudimentary technique of Levalloisian character.[2] Sandford calls it 'Early Monsterian'.[3] Caton-Thompson writes that "in the Oriental Institute Publications, Early Monsterian was used broadly to cover 'Early Levalloisian.' According to current practice, Early Monsterian is separated from the Lower Levalloisian in Europe by a glacial epoch."[4] She prefers to call it Acheulio-Levalloisian stage.[5]

In Lower Egypt the terrace of 25 ft. is characterized by Upper Levalloisian, while the terrace of 10-15 feet in the Upper and Middle Egypt by Lower Levalloisian. The industries discovered from 92 ft. and 112 ft. above sea level are called McBurney as 'Final Levalloisian' and 'Evolved Levalloisian,' respectively.[6] The Middle Palacolithic of Egypt seems to be different from that of India.

EUROPE

The earliest tools in Europe come from Mindel glaciation, Abbevillian handaxes with large oblong flakes struck by block-on-block technique. These flakes are now called Clactonian I and considered as a facies of Abbevillian handaxe culture.[7] The handaxes and flakes of Stage I from the Son valley may be compared with these tools. The first appearance of the use of the cylinderhammer technique is considered as the beginning of the Acheulian stage in the Lower Palacolithic culture of Europe.[8] This culture, however, appeared, there in Mindel-Riss interglacial, and afterwards at the beginning of Riss glaciation developed further—now known as Middle Acheulian. Towards the closing stage of this glaciation and at the beginning of Riss-Wurm interglacial, it reached its climax—called Upper Acheulian. It probably "represents a fresh wave of migration into Europe, when climatic conditions had sufficiently improved."[9] The Early Acheulian may be compared with the tools of second stage, while the Upper Acheulian with the tools of Stage III.

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1. McBurney (1960), *op. cit.*, p. 136
2. *Ibid.*, pp. 136-137
3. Sandford, *op. cit* , p. 67
4. Caton-Thompson, G , The Levalloisian Iudustries of Egypt, *PPS*, XII, (1946) p. 80. fn , 4
5. *Ibid* , pp. 80-1
6. McBurney, 1960, *op cit.*, pp. 145-149
7. Oakley, K P. Frameworks for Dating Fossil Man, 1964, pp. 140, 257
8. Leakey, L.S.B., 1953, Adam's Ancestors, p. 75
9. *Ibid* , p. 77

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The Clactonian, contemporary with the Lower Acheulian stage, is known as Clactonian II and is now also regarded as a facies of the Lower Acheulian. Some of the flakes of the Upper Son Valley are similar to the flakes of Clactonian II.

In Europe, the levalloisian technique was introduced very likely during the Riss glaciation, but in the Riss-Wurm interglacial period, its development took place. The industries of Middle Stone Age of Upper Son Valley yield eight such specimens.

Towards the end of Riss-Wurm interglacial, another industry, paying much more attention to the secondary work on the flakes than the preparation of the cores was practised in Weimar region and other parts in Northern Germany.[1] The Mousterian culture is distinguished into three variants by Leakey; *firstly*, the classical 'Mousterian,' *secondly*, Mousterian with Levalloisian elements, and thirdly, Mousterian, bifacially with strong elements of hand-axe and Levalloisian cultures.[2] McBurney calls the 'Mousterian' of Northern Germany as 'Western Mousterian' and the Mousterian which was adopted in "Eastern and Central Europe, from the Rhine to the Oxus basin."[3] The 'classical Mousterian consists of points, of scrapers and utilized flakes. The Middle Stone Age tools of the Upper Son Valley may be compared with the Mousterian, keeping in mind that the highly evolved phase of this technique is totally absent here.

However, its succeeding cultural horizons, the Chatelperonian formerly known as Lower Aurignacian, Aurignacian, Solutrean, Gravettian, Magdalenian and Cresswellian cultures[4] do not have their correspondents in the Upper Son Valley.

WESTERN ASIA

In Western Asia, the Southern Levant, the long and narrow strip which lies between the Eastern Mediterranean and the North Arabian Desert, is actively explored.[5] Its oldest industry, including small irregular flint flakes, chunks and a few well trimmed scrapers (Tabun C), is called Tayacian. It was succeeded by Upper Acheulian consisting of well-finished bifaces (Tabun F). The following industry of Upper Acheulian, which was formerly known as Final Acheulian of Micoquian, now because of the great predominance of scrapers is called as Yabrudian—the name given after the site Yabrud. The three Levalloiso-Mousterian horizons of the Tabun-once divided into Lower and Upper-are considered as local variations. However, this industry did not disappear abruptly but influenced the transitional industry,

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1. McBurney, 1960, p. 31
2. Leakey, 1953, p. 115
3. McBurney, 1960, pp. 32-33
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5. Garrod, D.A.E., and Bate, D.M A., 1937, The Stone Age of Mount Carmel,
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   1962, The Middle Palaeolithic of the Near East and the Problem of Mount Carmel Man, *JRAI*, Vol. 92, pp. 232-251.

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The Middle Palacolithic industries were discovered from the four horizons—30 ft. terrace in Upper Egypt and Nubia, 10-15 feet terrace in Middle Egypt, 25 ft. terrace in Lower Egypt and silt at Kom Ombo and Fayum The terraces of 25 and 10-15 feet either might be contemporary or the former may belong to the late last Interglacial.[1] In the terrace 30 feet of upper and Middle Egypt the handaxe iudustry with a somewhat rudimentary technique of Levalloisian character.[2] Sandford calls it 'Early Monsterian'.[3] Caton-Thompson writes that "in the Oriental Institute Publications, Early Monsterian was used broadly to cover 'Early Levalloisian.' According to current practice, Early Monsterian is separated from the Lower Levalloisian in Europe by a glacial epoch."[4] She prefers to call it Acheulio-Levalloisian stage.[5]

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Emiran. The industry overlying the Emerian was Aurignacian. "The Aurignacian of Palestine did not last nearly as long as the Aurignacian of Europe," and was replaced by Atlitian which was nearly similar to Upper Aurignacian. Contemporary with the Magdalenian and Azilian of Europe, in Palestine Kelaran culture flourished. Natufian closely related to the Tardenoisian of Europe appeared consisting of flint blade, points, crescents and burins. The Upper Acheulian handaxes of Mount Carmel may be compared with the Stage III of our Early Stone Age. The tools of LSA may also be roughly compared with the microliths of Kebaren and Natufian, though burin is totally absent here.

SOUTH EAST ASIA

The Lower Palacolithic culture parallel to the bifacial handaxe tradition in South East Asia seems to form an independent tradition consisting of two distinctive artifacts—choppers and chopping-tools. This tradition is known as chopper chopping-tool tradition.[1] It forms the characteristic feature of the Early Anyathian of Burma, the Choukutiennian of China, the Patjitanian of Java and the Tampanian of malaya, besides the Early Soanian of North-western India.[2] These industries include choppers, chopping-tools, handaxes and proto-handaxes—implements, the last group might be called as 'pointed handaxes.' The artifacts of these groups can be noticed in the pebble-tools and handaxe industries of Africa and Europe, but the distinctive feature is the absence of true bifacial handaxes from the chopper-chopping-tool industries.

In the Early Choukoutienian flakes, only a small percentage has marginal retouch and a majority of them side-scrapers. The handaxes found in the Patjitanian culture of Java after examination "proved to differ fundamentally from Chellean or Abbevillian handaxes, for the flaking on both faces of the Javanese core-tools is mainly longitudinal instead of criss-cross ; there is little doubt that they developed independently of their Eur-African equivalents, even if perhaps they served a similar function." A few flakes of this industry show faceted platform.

Mrs. Ann Sieveking classified the artifacts into large points and small points (proto-handaxes and chopping-tools of Movius). In her view, the artifacts which she calls pebble-picks are the oldest implements of this industry, and closely resemble some Oldowan pebble-tools." Oakley points out that "the number of alternative tool-forms in an assemblage of primitive stone artifacts is so limited that it is difficult to feel any confidence in attempts to face detailed cultural affinities between one group and another when they are widely separated.

The choppers and chopping-tools of the Upper Son Valley can be compared with the similar tools of these culture, though entire cultural assemblage represents a different tradition-handaxe.

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1. Albright W.F., 1956, The Archaeology of Palestine, A Pelican Book, p. 52
2. Oakley, *op. cit.*, 1964, p. 217
3. Oakely, *op. cit.*, 1964, pp. 228-256

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8

Conclusion

The ESA in the Upper Son Valley, most probably marked its appearance at the onset of the first wet phase.[1] However, the industries of ESA in the Son Valley do not show any development. The artifacts made by the 'stone hammer' and 'cylinder hammer' technique come from the same deposits – the first gravel. The tools of Stage I manufactured by 'stone-hammer' technique are more rolled than the tools of Stage II made by 'cylinder hammer' technique. Stage II tools show the characteristics of both the techniques.

The pebble tools from this Valley were found associated with the Abbevillian and Acheulian handaxes and flakes. But these suggest that the abundance of naturally available pebbles in the river beds led them to make "simple pebble tools along side with the more complicated Acheulian handaxes."[2] However, some scholars hold the view that this region was probably the meeting place of Sohan and Madaas cultures.[3] But the theory of the intrusion of Sohan culture in this region only on the basis of pebble-tools which "only suggests the wisdom of the palaeolithic man in using whatever raw material was available

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1. The gravels deposited during the wet phase were likely to have been formed in the preceding dry climate. The gravels of second deposit are smaller than the first dry period, probably the same size of rocks would have been weathered, but they are not recorded in the deposits. It seems that the intensity of the second wet phase was not as great as the first one, and therefore, it could not bring bigger boulders as they were brought down in the first wet phase. Sankalia also thinks that in the second wet phase, the climate was less humid than in the first wet phase. (Sankalia, *op. cit.*, 1962, p. 76)
2. Zeuner, F.E., 1951, Prehistory in India, p. 18
3. Krishnaswami and Soundara Rajan, *op. cit.*, 1951, p. 64

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near about his settlements,"[1] cannot be sustained. These pebble tools—at present stage of our knowledge—were a part of handaxe culture.[2]

The MSA tools belonging to second wet phase have also been discovered. Whether their origin prior to this time cannot be said with certainty. But it is likely that the lst dry phase, when the thick forests had been reduced, gave birth to this new culture-with smaller tools in comparison with the former preferably on silica chalcedony materials by Acheulian and Levalloisian techniques and introducing new tool-types, because choppers, chopping-tools, handaxes and cleavers were not suitable to their new environment. The true Levalloisian flakes indicate that 'Levalloisian' technique evolved during the MSA time, though this technique in the cruder form was known in the earlier phase. The 'Levalloisian technique' may be called as the characteristic technique of the Middle Stone Age

It has recently been suggested that this culture was not indigenous to India but came from outside Bridget Allchin writes that "the closest parallel, in terms of environment and stone technology is provided by Middle Stone Age industries of Africa, south of the Sahara,"[3] but afterwards she said that "it was in early stages at any rate, in contact with comparable industries in Central Asia and later developed in comparative isolation in the regions southeast of the Sind desert for a long time."[4] Sankalia urguing against the indigenous origin, writes that the absence of handaxe and cleaver, smaller tools and the preference of fine-grained materials certainly indicate the arrival of new people from outside. "It may be north or south of the Sahara, or even both."[5] The handaxes recorded in Nevasa, Malwa, Bundelkhand, Western Rajasthan, and Kurnool and cleavers from Western Rajasthan show their persistence in MSA time, which in all probability were inherited from Early Stone Age. However, this problem can be settled only when much fuller stratigraphical evidence is available and on a first-hand comparative examination of the Indian, African and Central Asian MSA industries is carried out.

The MSA culture flourished probably up to the end of the Pleistocene period or continued slightly in the early Holocene.

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1. Joshi, R V., 1953, Influence of raw material on the Lower Palaeolithic Industry of the Malaprabha Basin (Bombay State), *p-4th*, *I S.C.*, pt. III, p. 59
2. Joshi writes that the pebble tools found in this region "had no specific typological relationship with the Early Sohan ; instead, the stages of fabrication represented by them revealed their own story of gradual typological evolution from the unspecialized core of the bifacial handaxe." (*AIR*, 1957-58, pp. 25-26). However, neither from this Valley nor from other parts of India, any stratified deposit exhibiting gradual evolutionary stages from choppers to Acheulian handaxes has been brought to light."
3. Allchin, Bridget, 1959. The Indian Middle Stone Age : Some New Sites in Central and Southern India, and their Implications, "*BLUIA*, No. II, p. 35, quoted by H.D. Sankalia, *op. cit* , 1962, p. 123.
5. *Ibid* , p. 29.
5. Sankalia, *op. cit.*, 1962, p. 123.

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In the Holocene period another culture, which has been styled as the Late Stone Age came into existence, probably evolving out of the Middle Stone Age.

The LSA culture has been found succeeded by Chalcolithic cultures in other parts of M.P., particularly the Northern and southwestern. But no traces of these were noticed by the author in the Upper Son Valley during the survey. These cultures indeed herald the emergence of early Village and farming communities, and looking to the thick, forested nature of the Upper Son Valley, even today, these cultures are not likely to have flourished here.

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SITES

AOI	Akaori
APR	Anuppur
BBD	Bicharpur
BBI	Babbori
BCA	Barachanda
BCE	Beeche
BDA	Bhadora
BGA	Bargama
BGN	Bargaon
BGR	Baghor
BHI	Barhai
BJI	Banjari
BKI	Bakahi
BLI	Bhelki
BNA	Bandhua
BPR	Bhimpur
BRH	Bijeraghogarh
BRI	Burdi
BSA	Bhanvarsen
BSI	Basari
DRA	Diruria
DSR	Deosar
FHR	Fatehpur
GJI	Ginjiri
GRA	Gara
GNI	Ghangari
GRI	Goral
GTA	Ghitaora
HHI	Harhi
HNI	Hinori
HRA	Harha
JDA	Jegdah Bridge
JDAH	Jegdah Hill
JKO	Jhoko
KA	Kua
KIA	Khaira
KNR	Kalianpur
KPR	Khairpur
KRP	Kanchanpur
KRR	Kusarwar
KRT	Khamrist
LGN	Loharganj
LPR	Lalpur
LWR	Laowar
MGI	Margiti Hill
MJA	Majona
MKY	Markandey
MRA	Murwara
MU	Mau
NJR	Nkjhur
NTA	Nawatola
NWA	Nowreha Hill
PNA	Parnia
RGT	Rajghat
RNN	Ruhanian
RNR	Ramnagar
SDI	Suddi
SDL	Shahdol
SHL	Shawal
SI	Sidhi
SNI	Sohagpur
SPR	Samatpur
SRI	Singrauli
STA	Salamtola
URA	Umaria

OTHERS

ESA	Early Stone Age
MSA	Middle Stone Age
LSA	Late Stone Age

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STONE AGE SITES

DIST REWA

NAGOD

REWA

KATNI

DIST. JABALPUR

JABALPUR

DIST. SIDHI

SIDHI

DIST. SURGUJA

DIST. SHAHDOL

SHAHDOL

DIST. MANDALA

MANDALA

DINDORI

AMARKANTAK

R. SON

R. MAHANADI

R. JOHILA

R. NARBADA

R. MUWATI

R. CHUNDI

R. GOPAT

R. MOHAN

R. RIHAND

R. BANAS

R. KEN

SCALE

0 8 16 24 32 MILES

SITES

- ○ EARLY STONE AGE SITES
- ● MIDDLE STONE AGE SITES
- △ LATE STONE AGE SITES
- □ MODERN TOWNS

PAKISTAN

AREA OF MAP

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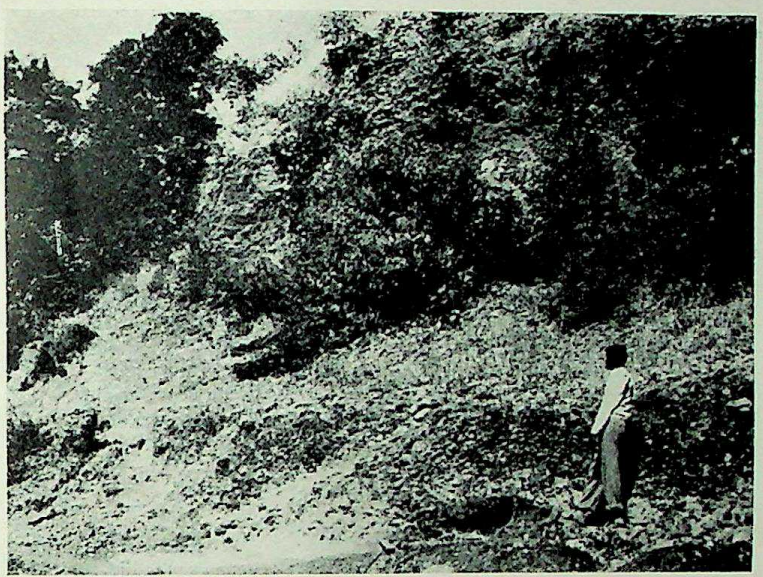

Plate II. Section at the right bank of the Johilla at Barachanda

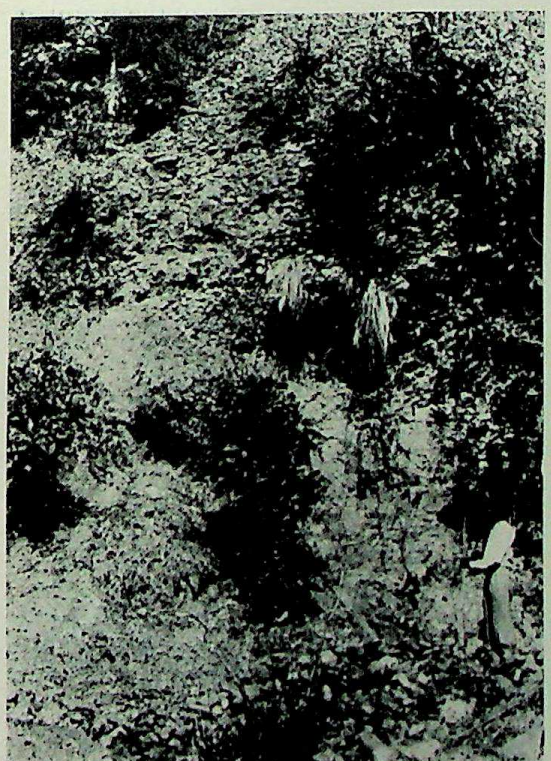

Plate III. A close view of the section of the Johilla at Barachanda

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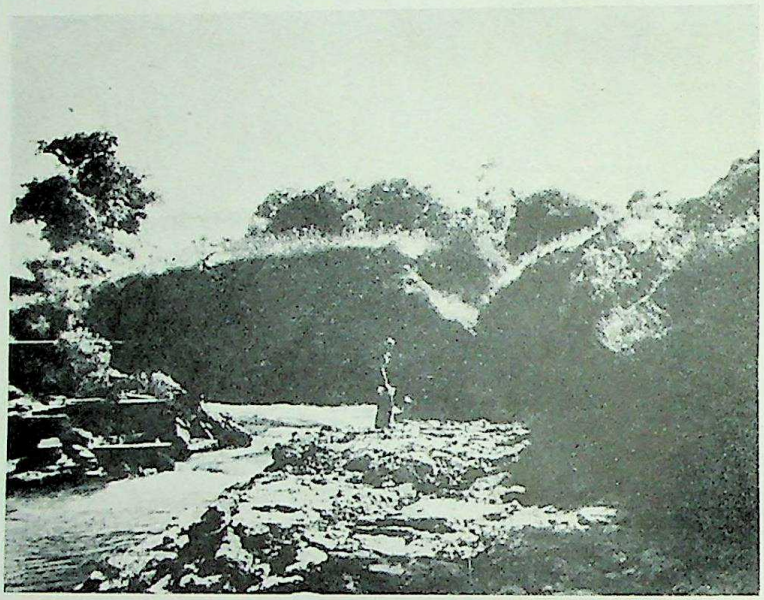

Plate IV. Section I at the right bank of the Katni at Murwara

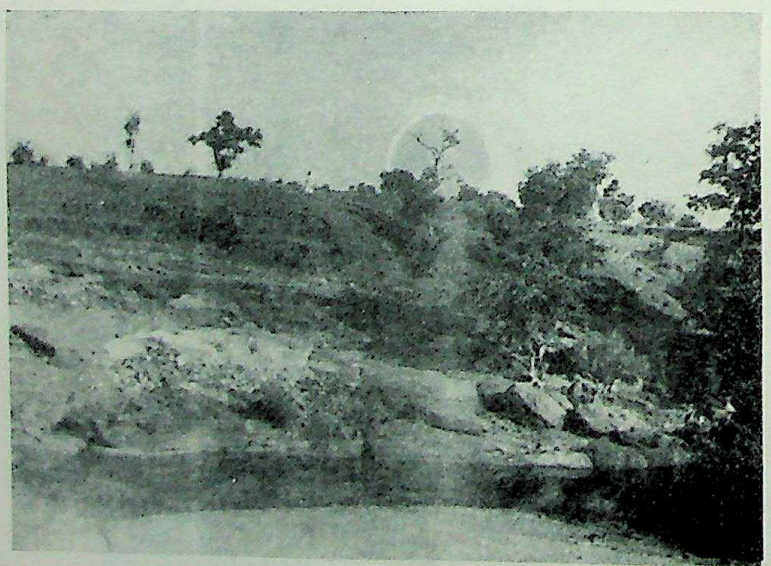

Plate V. A view of the right bank of the Chundi at Kusarwar

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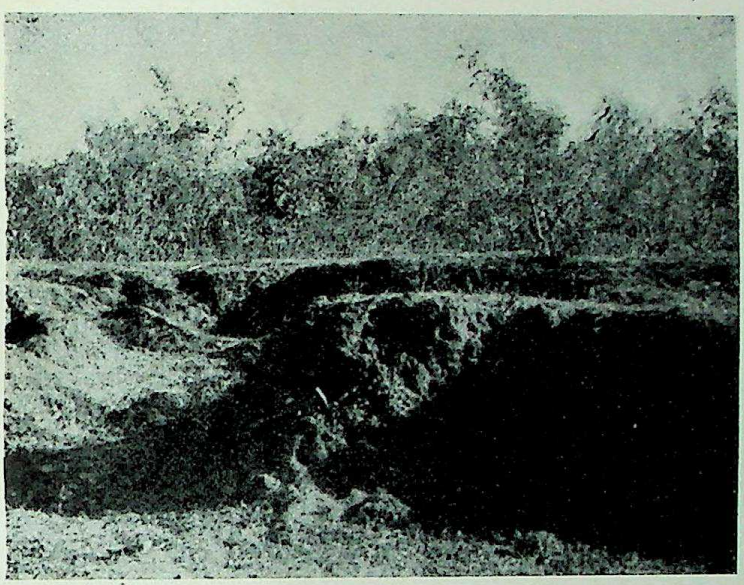

Plate VI. Section at the right bank of the Son at Jogdah Bridge

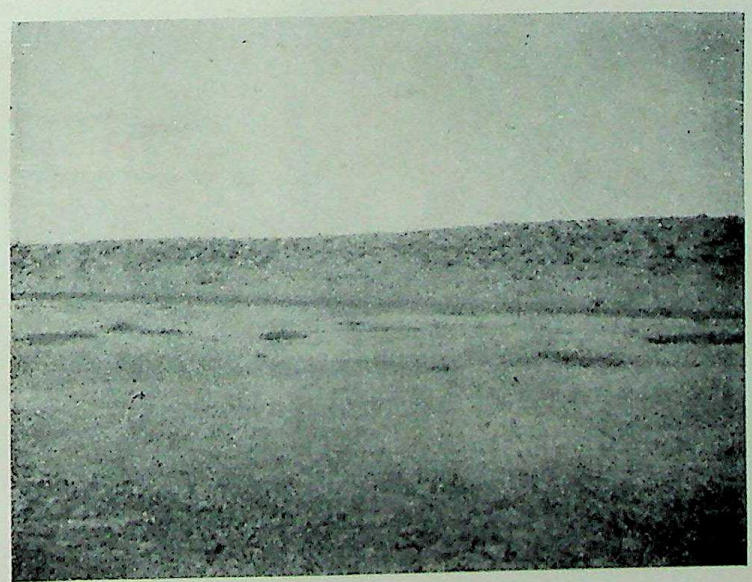

Plate VII Hill at Hinoti-A LSA Factory Site

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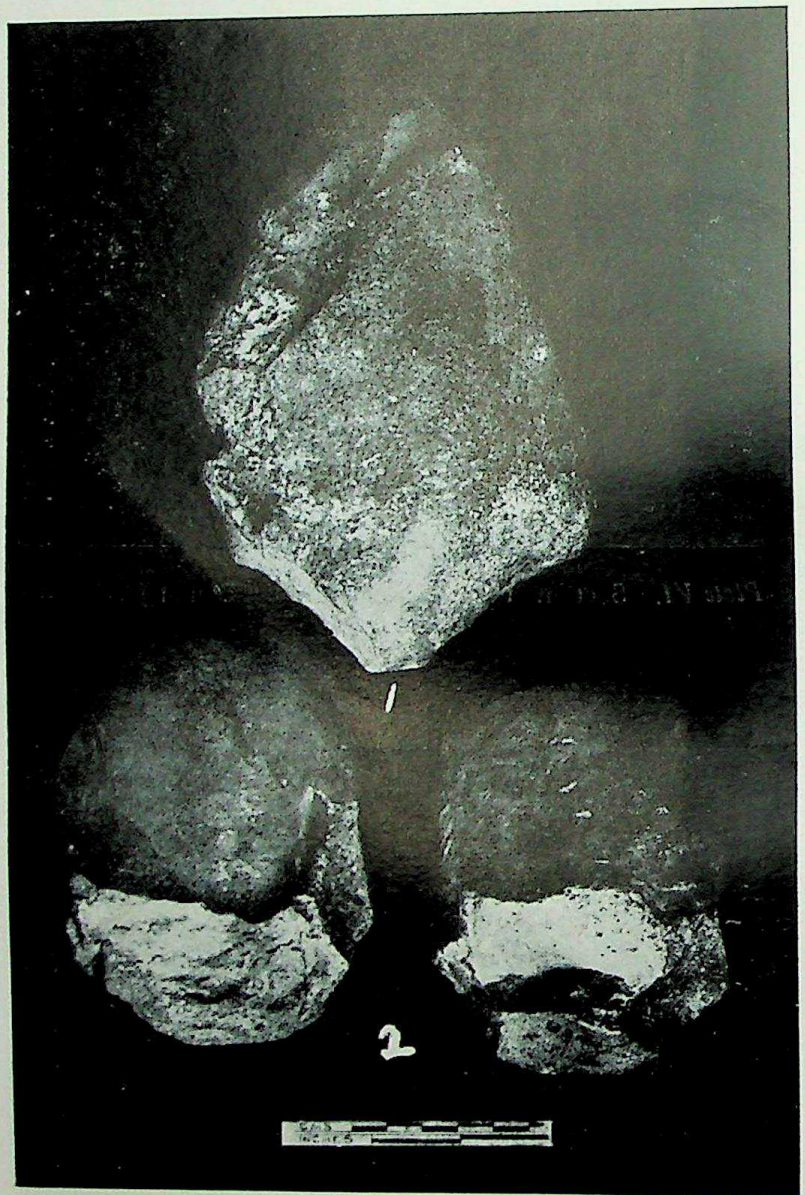

Plate VIII. Fig. 1. Chopper-MRA-27
Fig. 2. Chopping Tool-BCA-21

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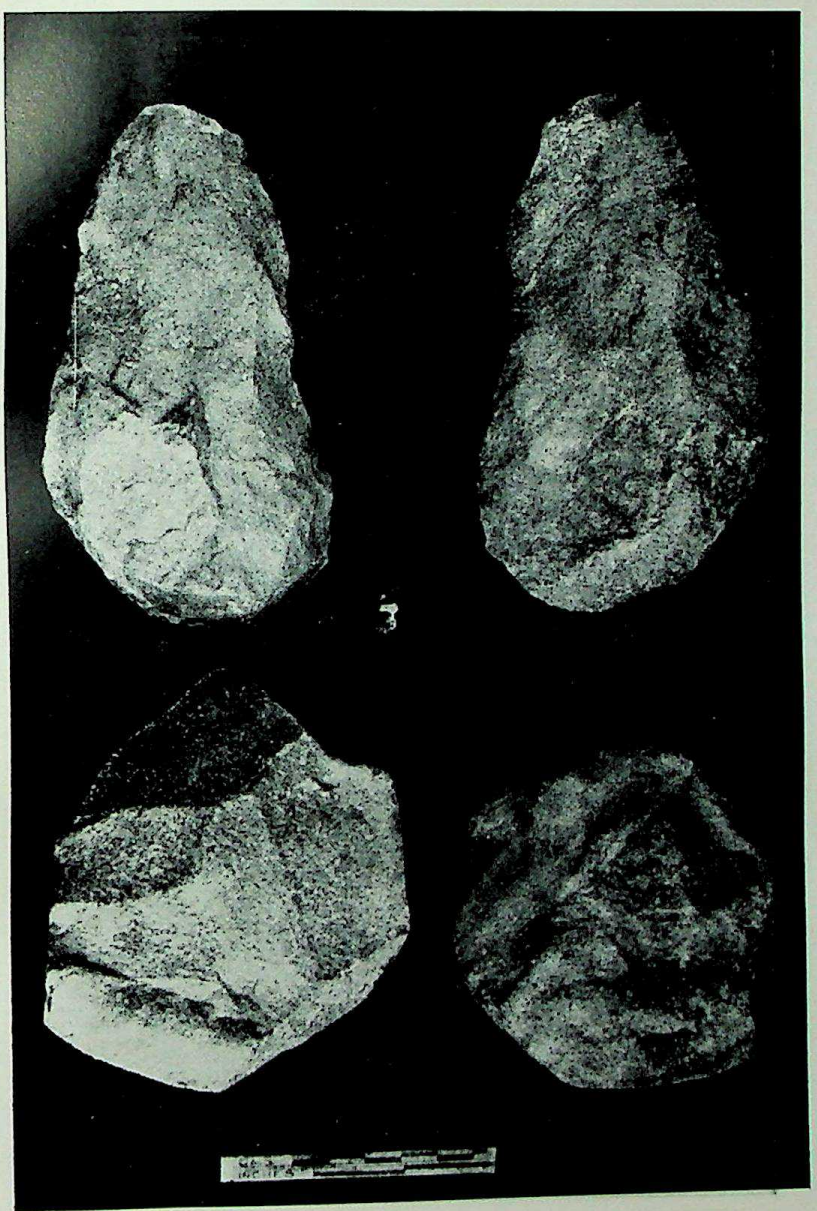

Plate IX. Fig. 1. Pear-shaped handaxe on core : STA-2
Fig. 2. Chopping-tool : NTA-2

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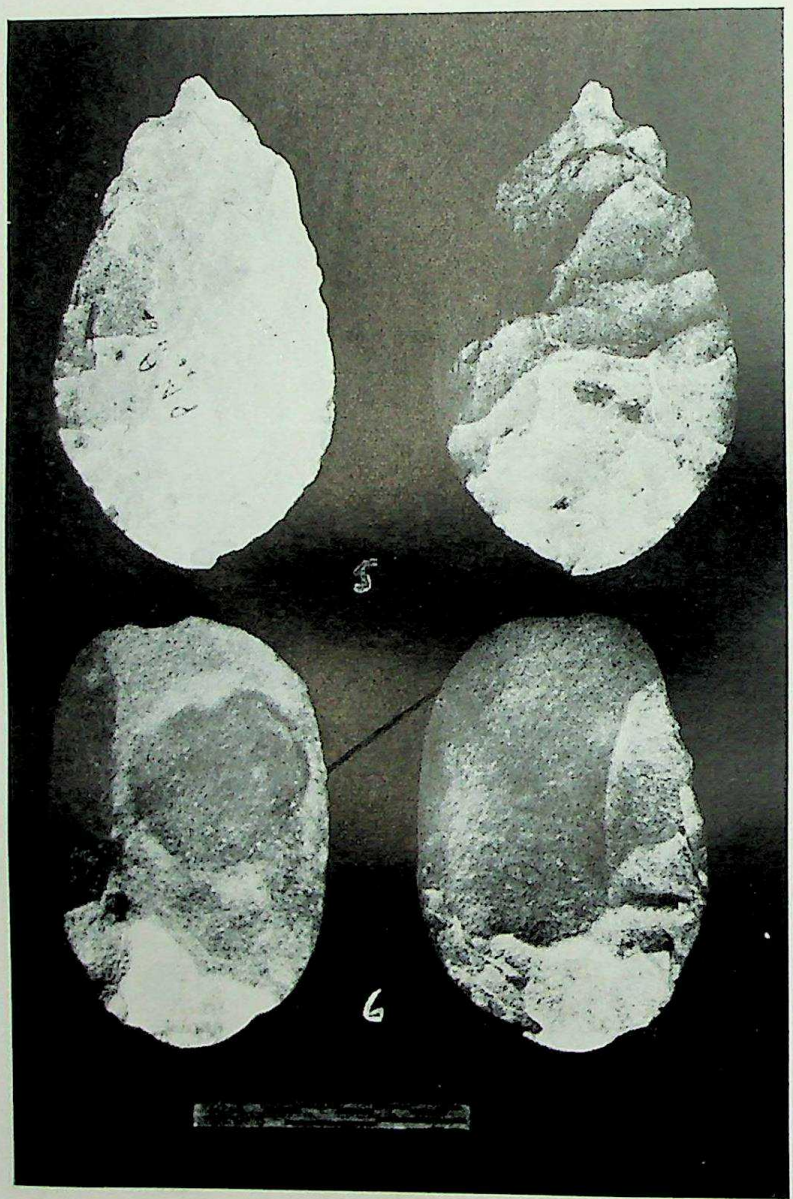

Plate X. Fig. 1. Elongated Oval shaped handaxe on core : PNA-10
Fig. 2 Canvex-edge U-shaped cleaver on flake : AOI-2

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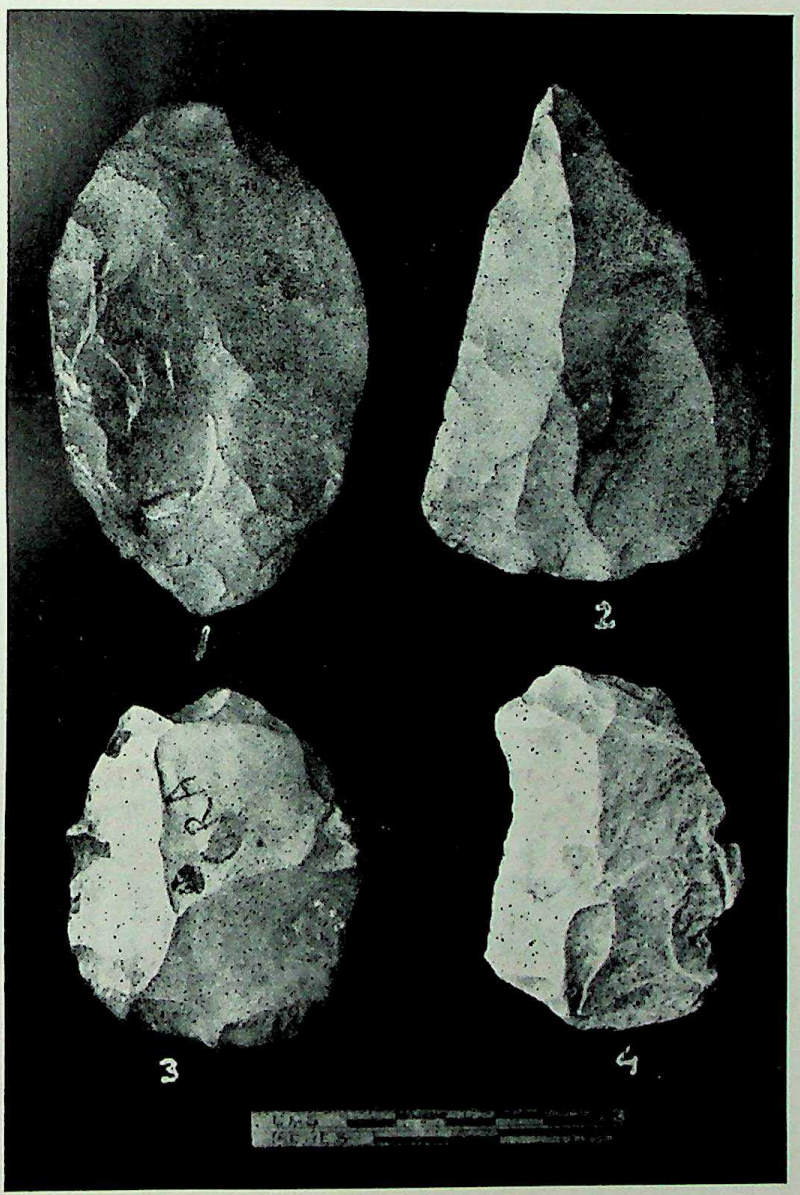


Plate XI. Fig. 1-2. Round Scrapers on core : BGR-9; GRA-3
Fig 3. Simple Point on core : PNA-7
Fig. 4. Levalloisian flake : PNA-4

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

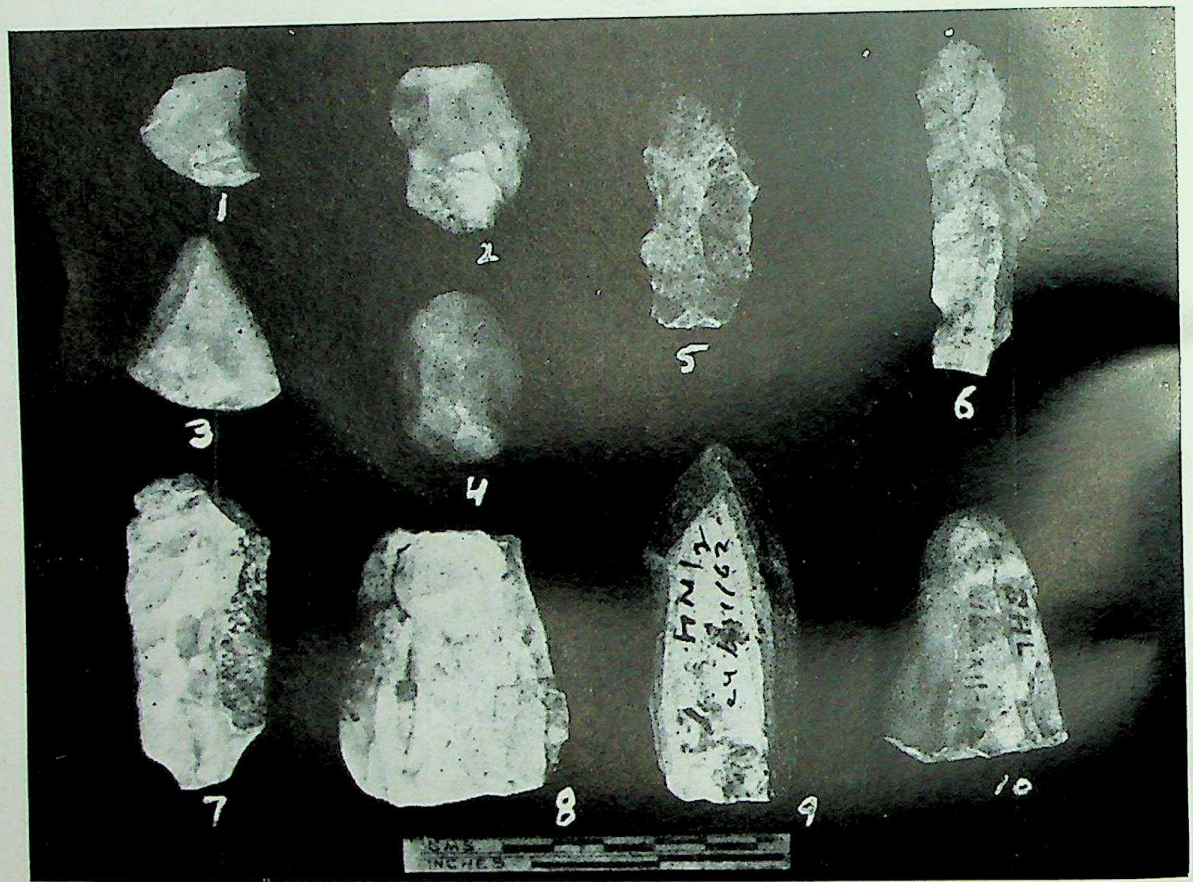


Plate XII. Fig. 1. Single Hollow Scraper on flake : BHI-29
Fig. 2. Side, Hollow and End Scraper on flake : SHL-37
Fig. 3. Simple point : SHL-111
Fig. 4. Tanged Point : HNI-65
Fig. 5-6. Used Blades : BLI–5; HNI-33
Fig. 7. Simple Blade : KRR-2
Fig. 8. Flake-Based Blade core : HNI–1
Fig. 9. Oblique-ended Blade core : HNI-2
Fig. 10. Pointed Blade core : SHL-92

Plate XIII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

BLACK BROWN SOIL

YELLOW BROWN SILT

YELLOW BROWN SANDY SILT

DARK BROWN SILT

DARK BROWN SANDY SILT

KANKARIZED SILT

KANKARS WITH PEBBLES

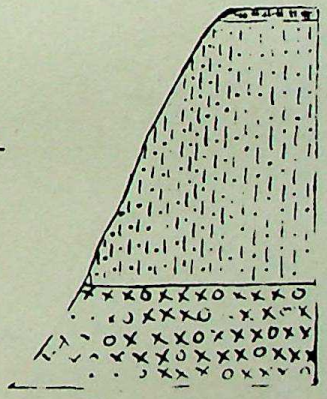
SANDY GRAVEL

SANDY PEBBLY GRAVEL

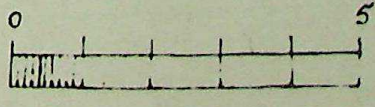
PEBBLY GRAVEL

BOULDERY PEBBLY GRAVEL

ROCK



Section at the right bank of the Son at Nawatola



Metre

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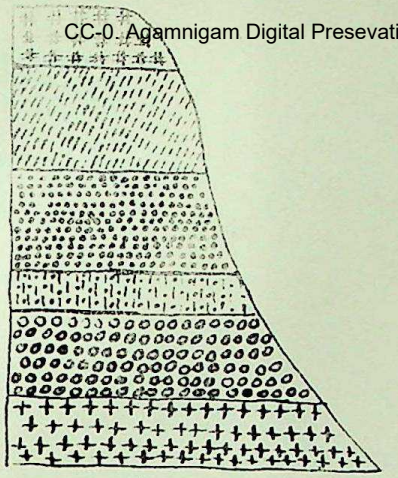
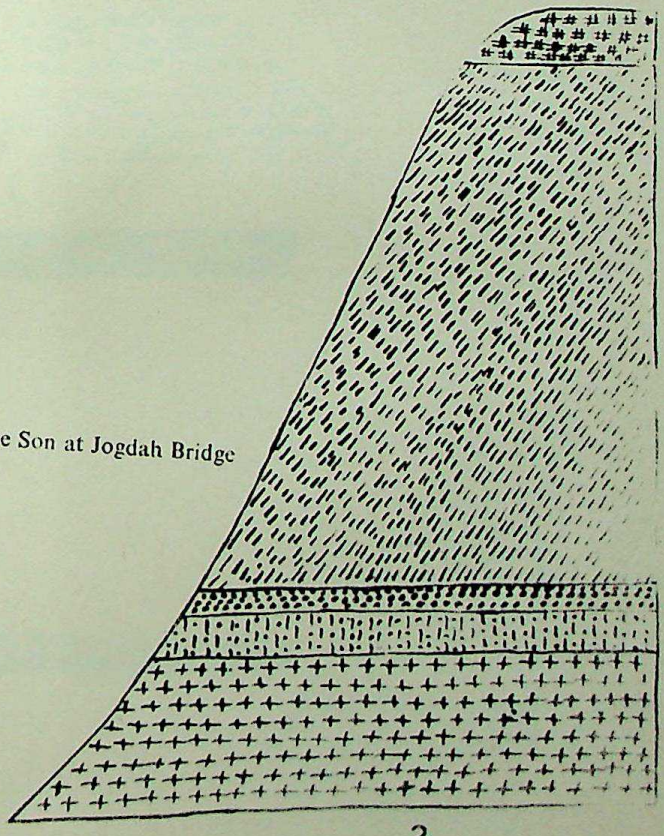
Plate XIV

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



1

Section at the left bank of the Hiranya at Parnia



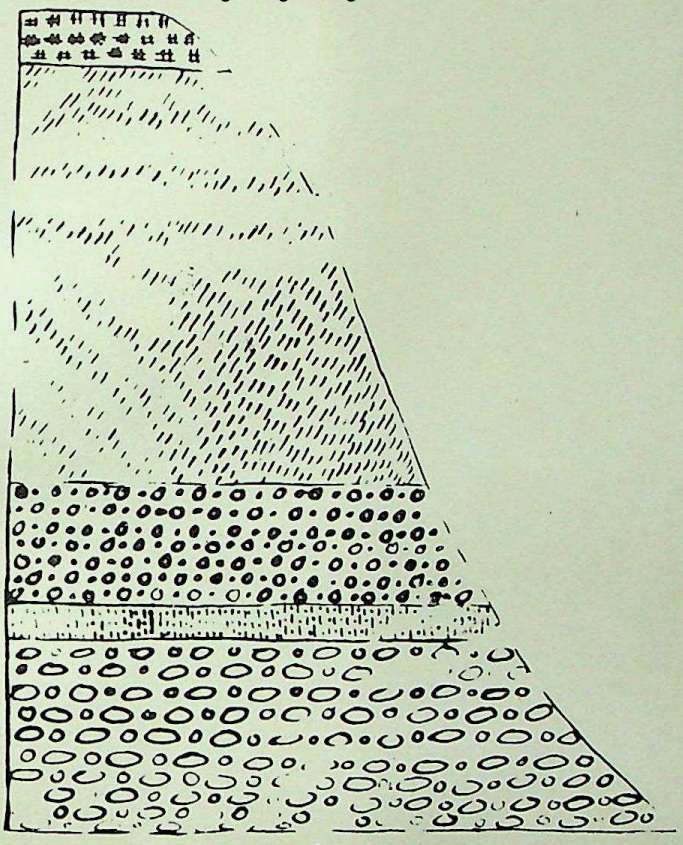
Section at the right bank of the Son at Jogdah Bridge

2

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XV

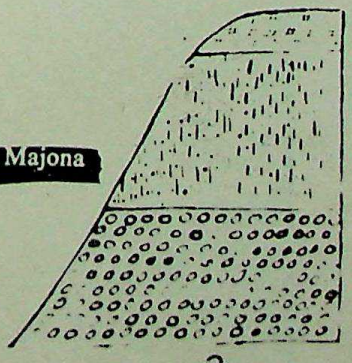
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



1

Section at the left bank of the Son at Ramnagar

Section at the right bank of the Mohan at Majona



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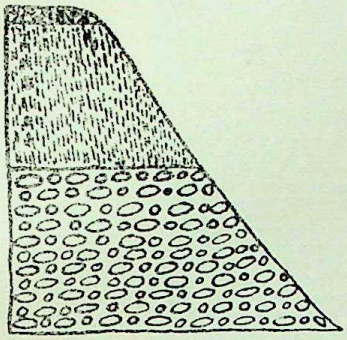
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

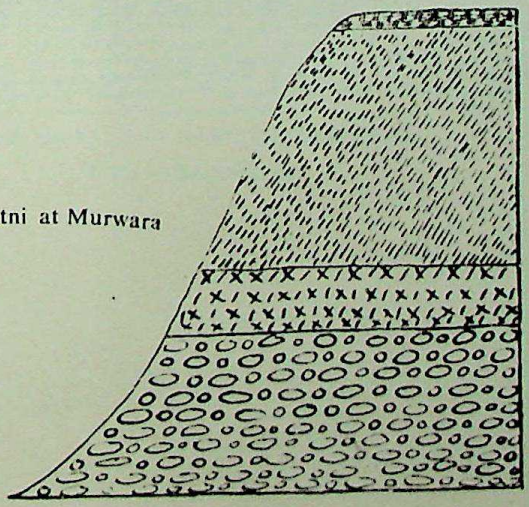
Plate XVI



1

Section at the right bank of the Jhepawan at Banjari

Section I at the right bank of the Katni at Murwara



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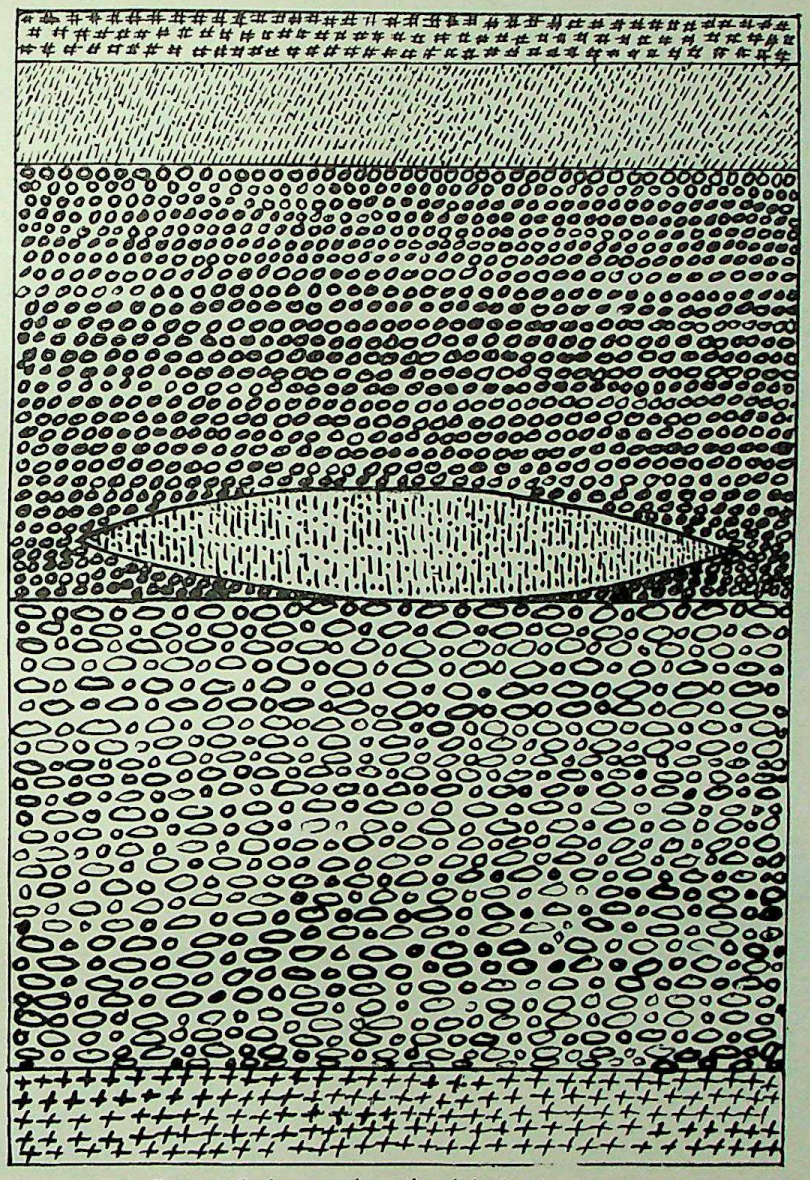
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



Section facing south at the right bank of the Johilla at Barachanda

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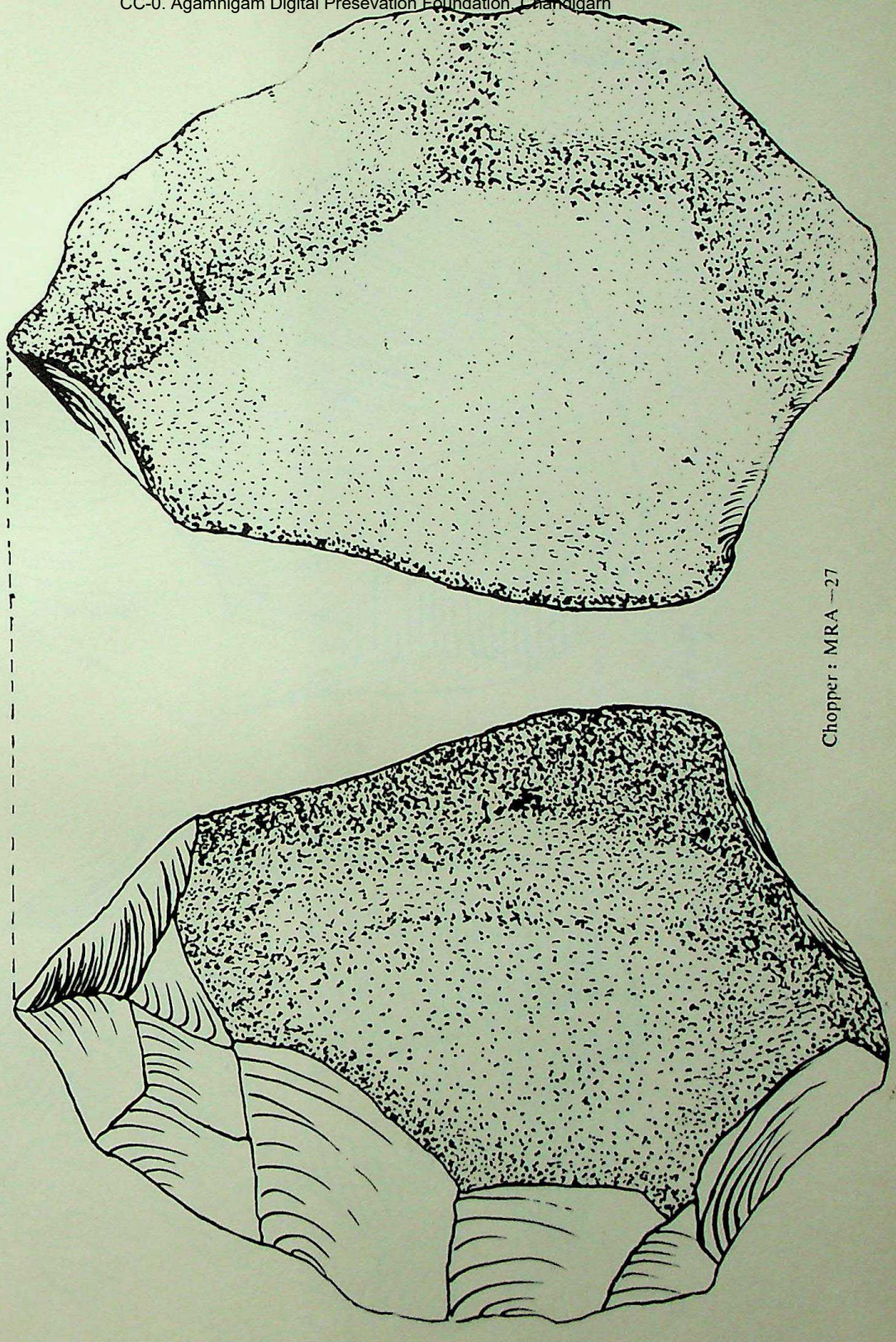
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

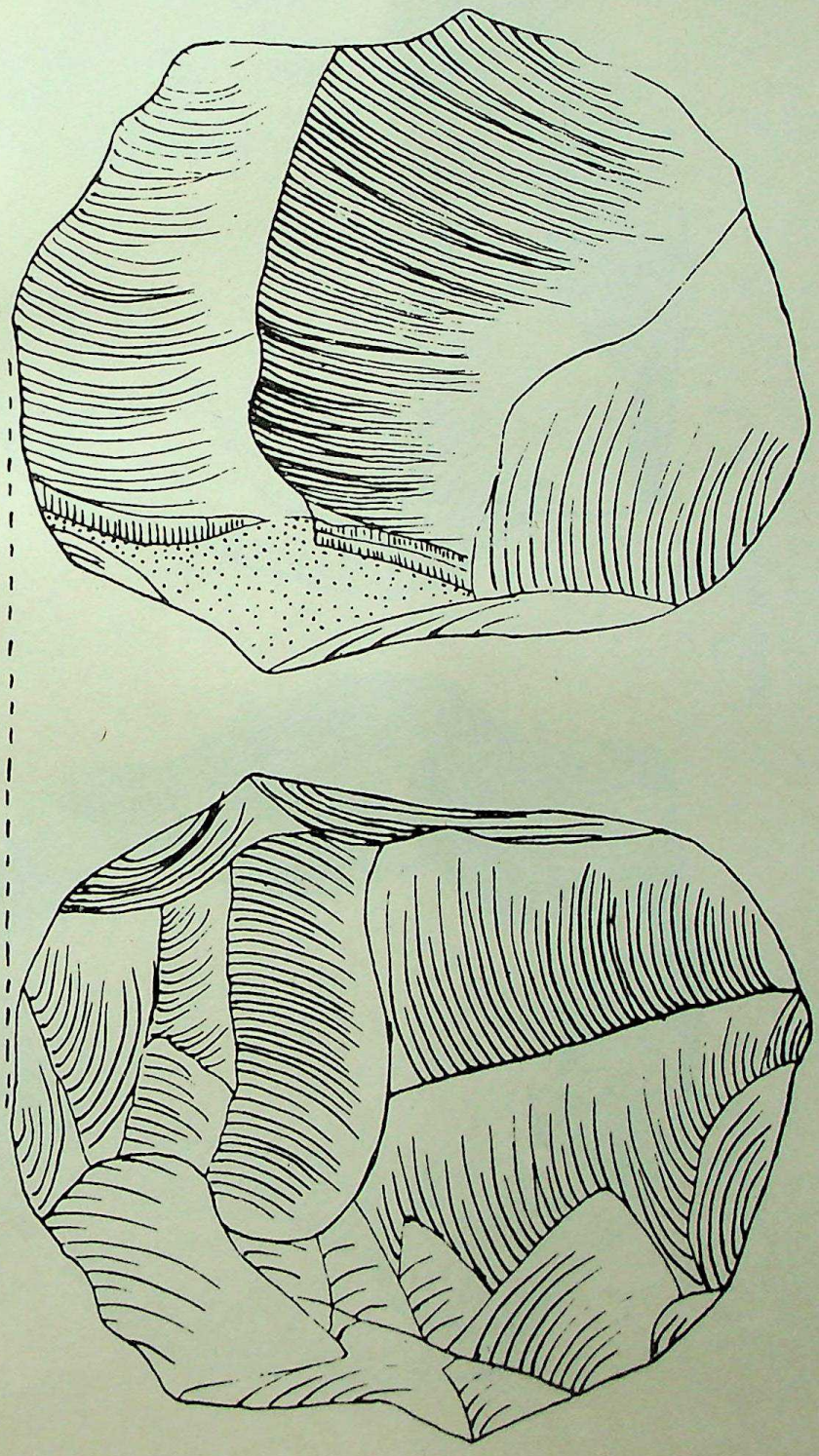


Chopper : MRA —27

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XIX

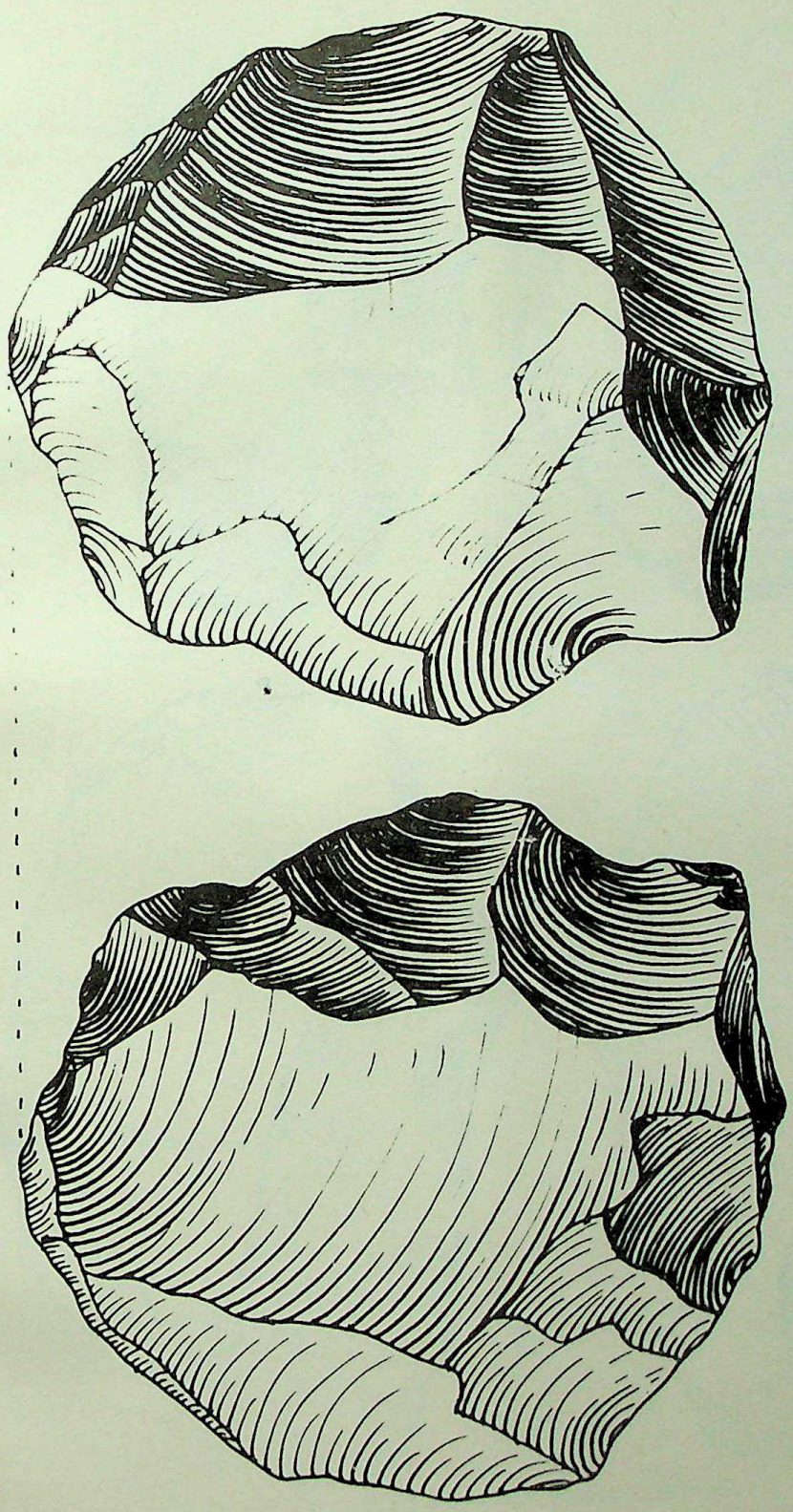


Chopping-Tool : BCA—21

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XX

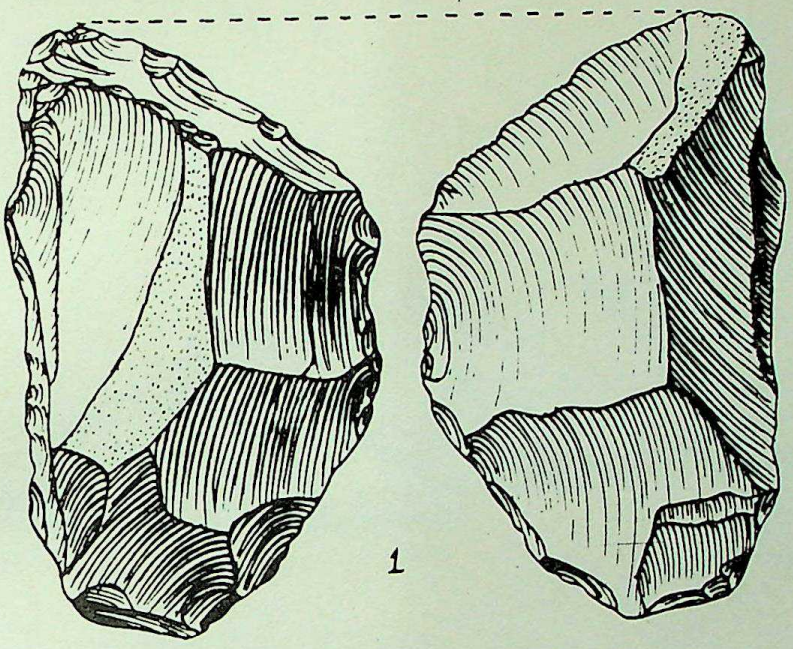


Discoid : MRA—20

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XXI



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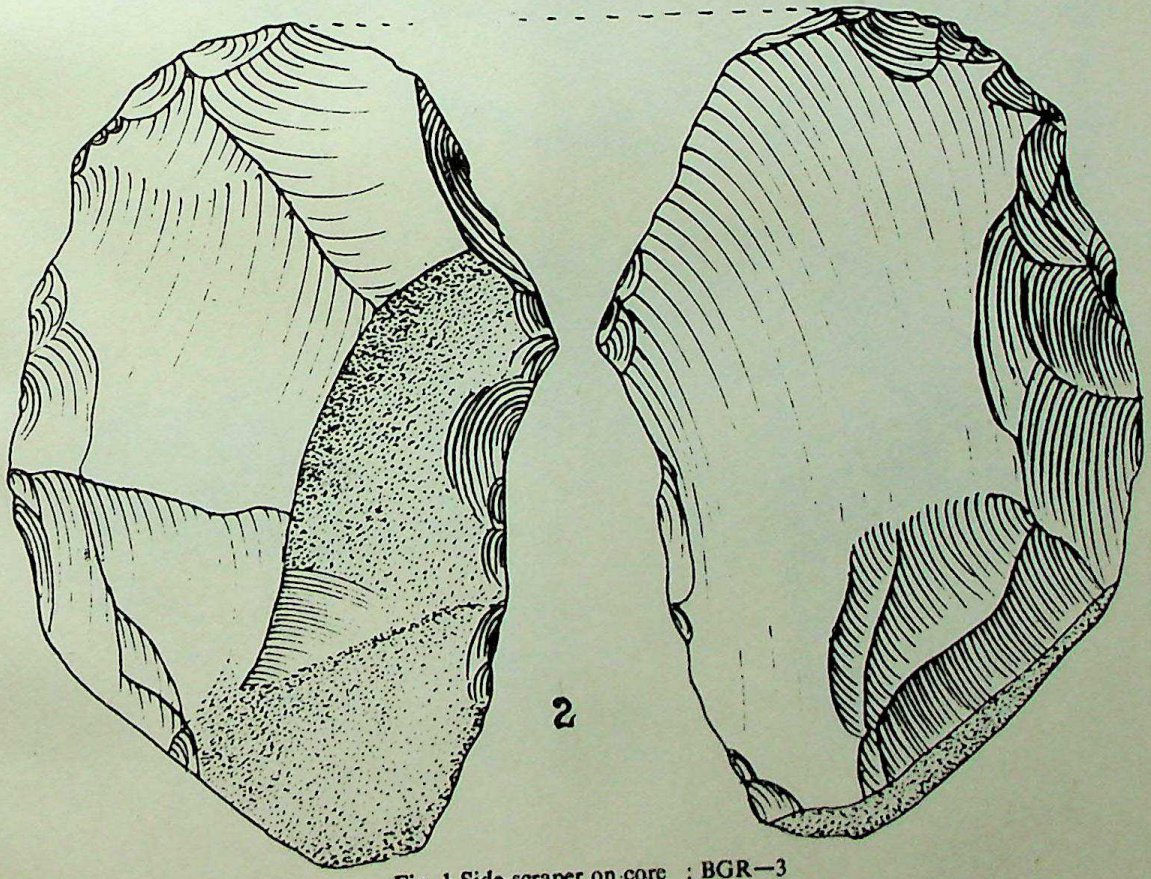


2

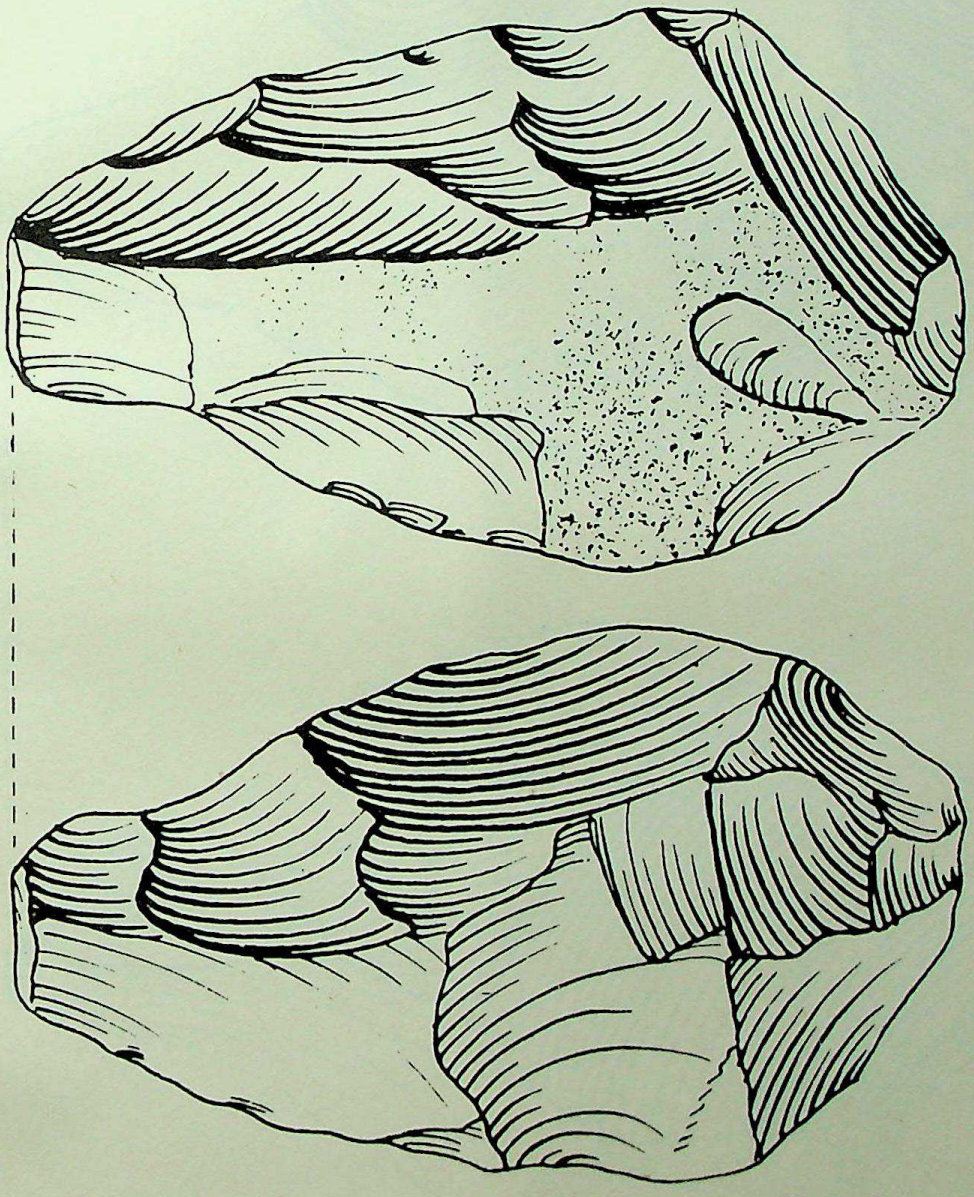
Fig. 1 Side-scraper on core : BGR—3

Fig. 2 Side-scraper on flake : SHL—10

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XXII

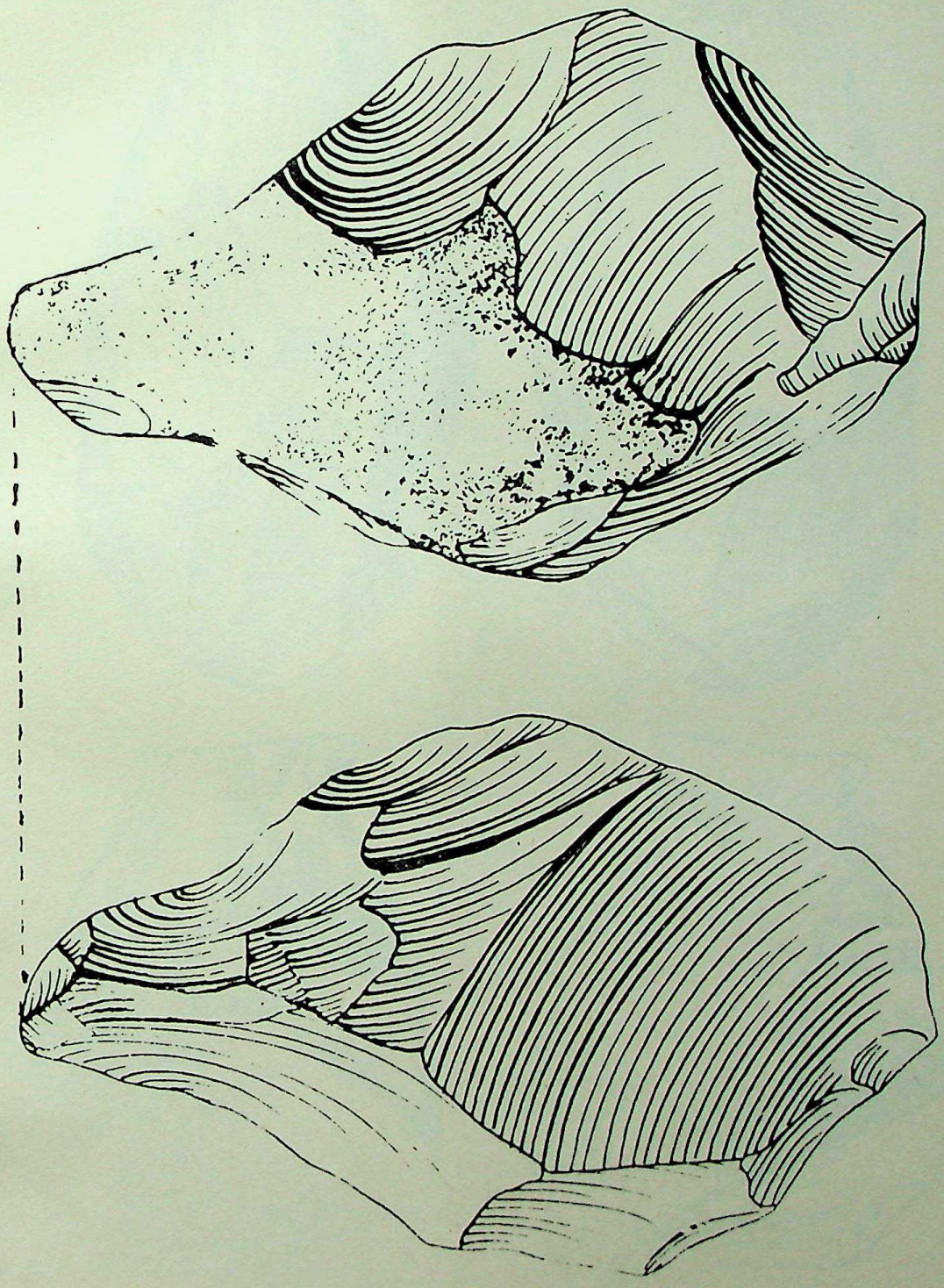


Almond-shaped handaxe on core : MRA—23

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XXIII



Pointed handaxe on core : MRA—1

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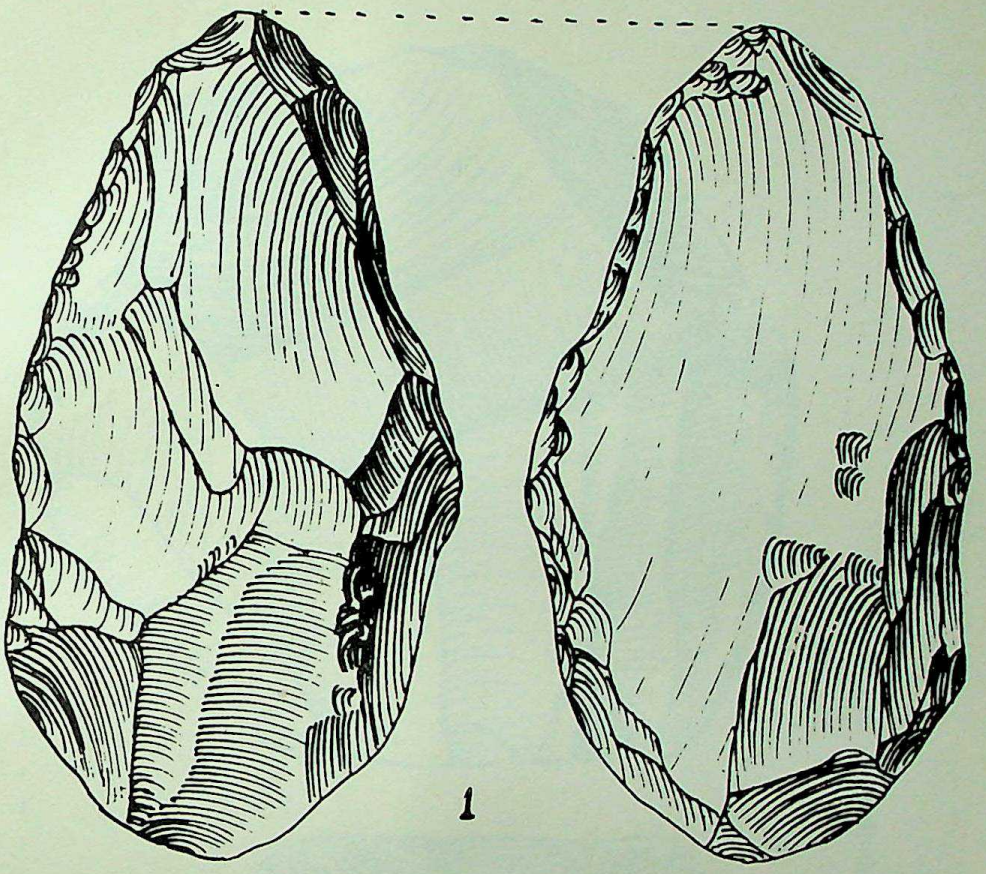
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XXIV



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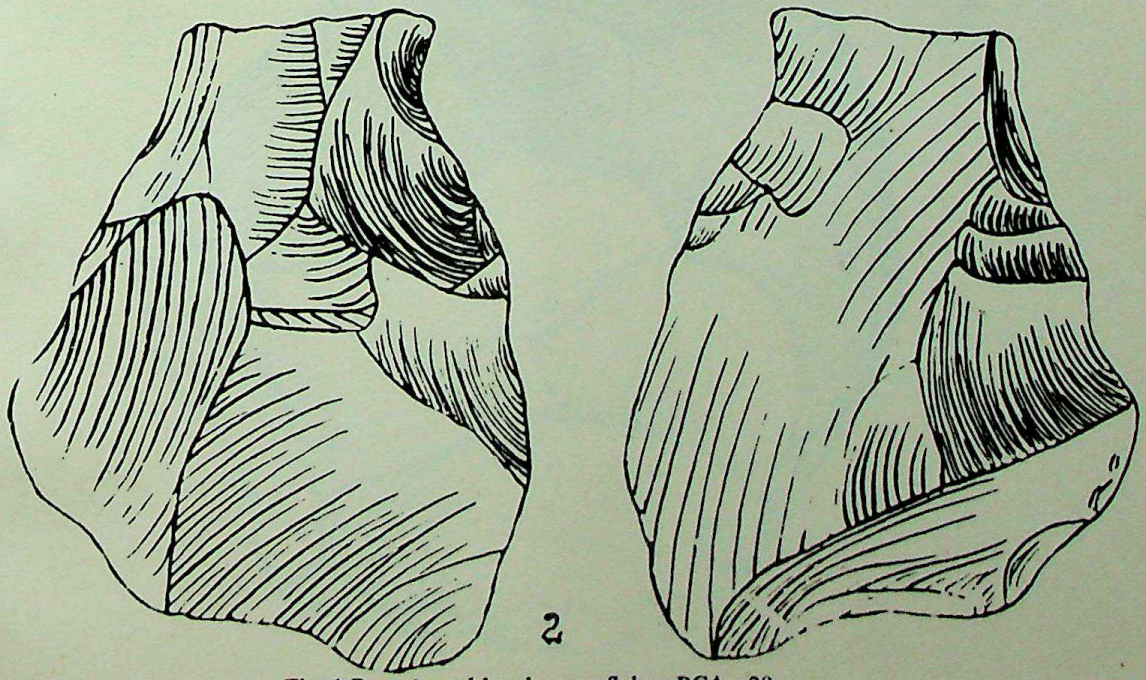


2

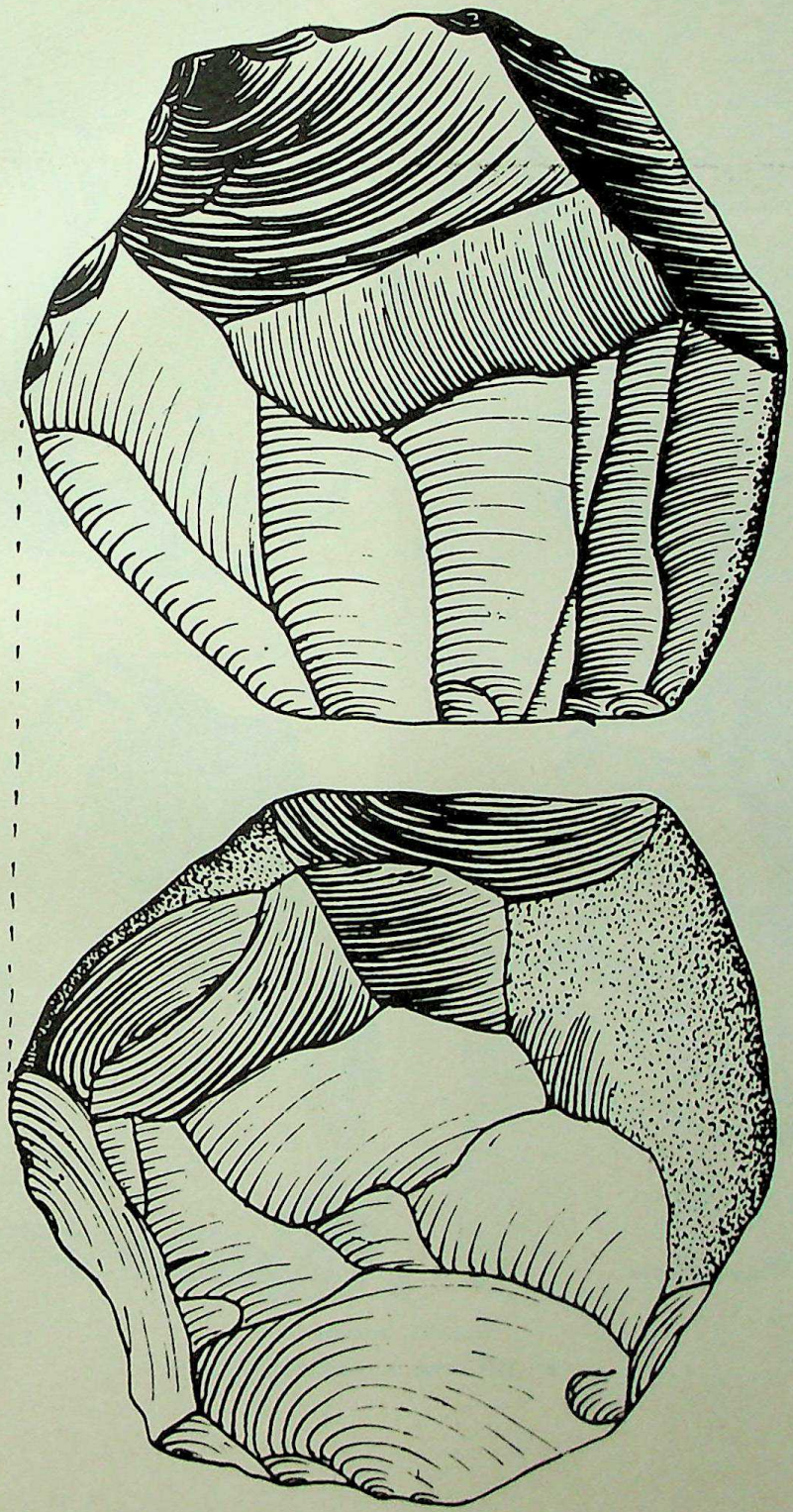
Fig. 1 Pear-shaped handaxe on flake : BCA : 28

Fig. 2 Triangular handaxe on flake : BRI—2

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

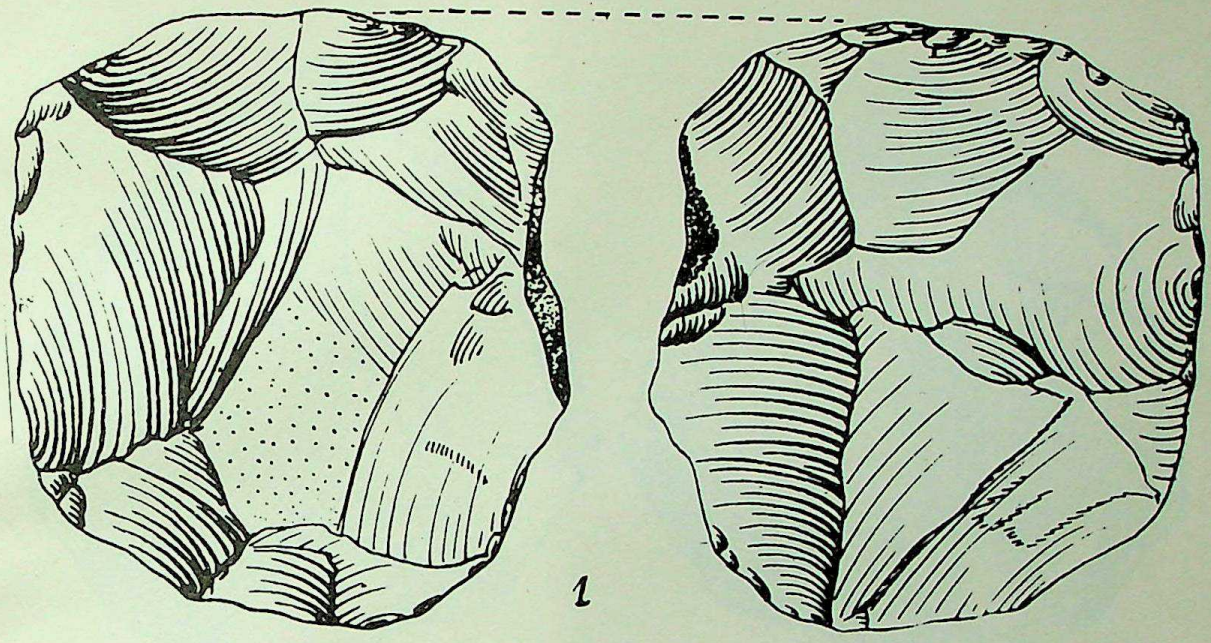
Plate XXV



Chopping-Tool : MTA—2

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



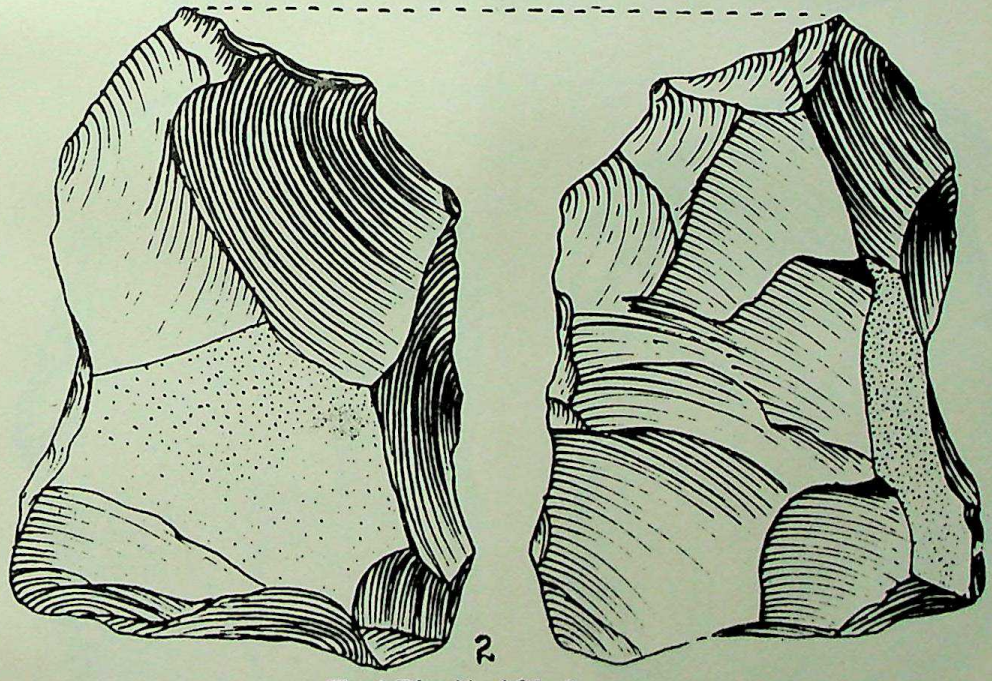


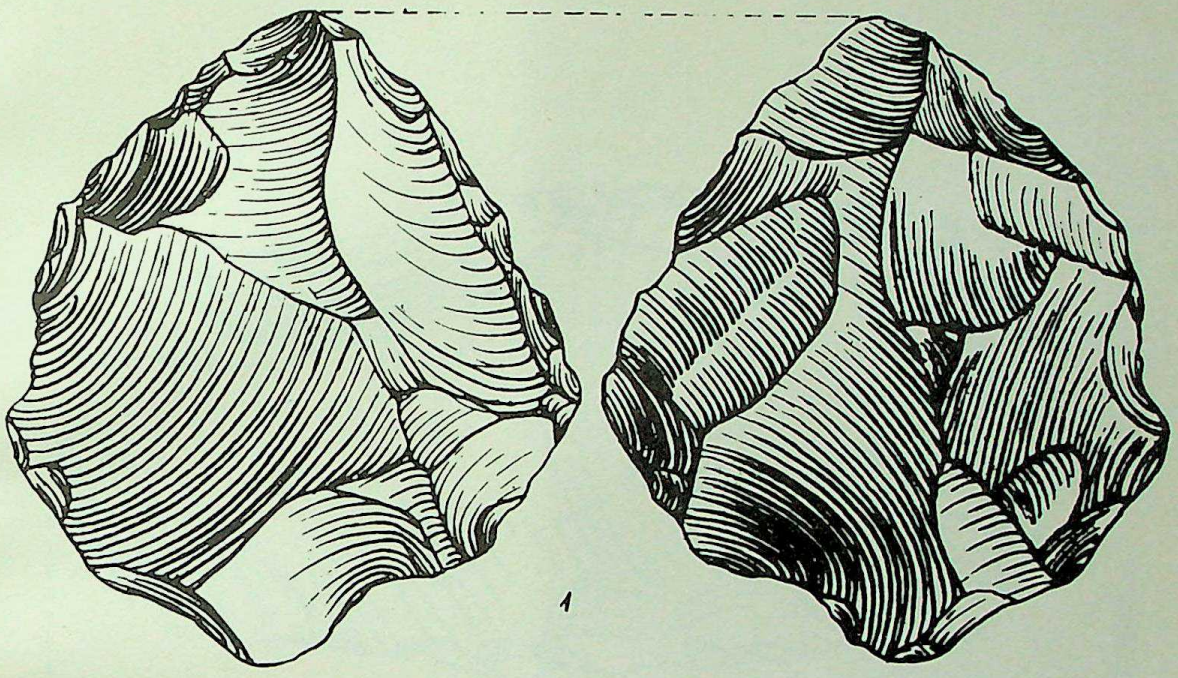
Fig. 1 Discoid : AOI—3

Fig. 2 Side-scraper on core : SHL—8

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XXVII



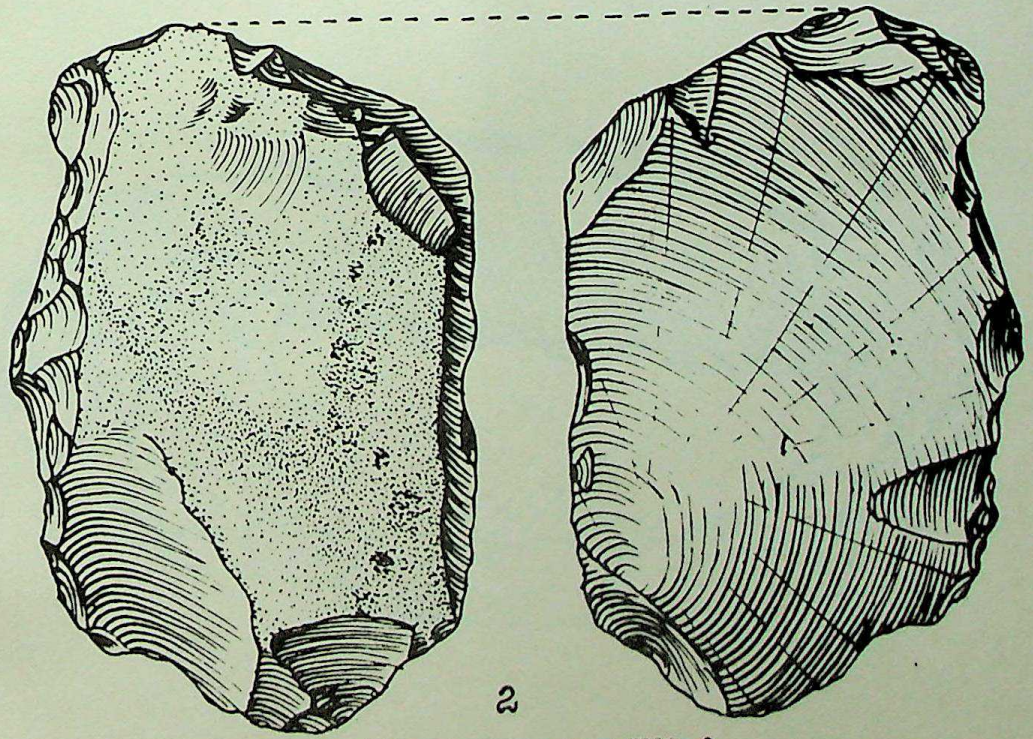


Fig. 1 Round-scraper on core :PNA—2

Fig. 2 Single-sided side-scraper on flake : GNI—2

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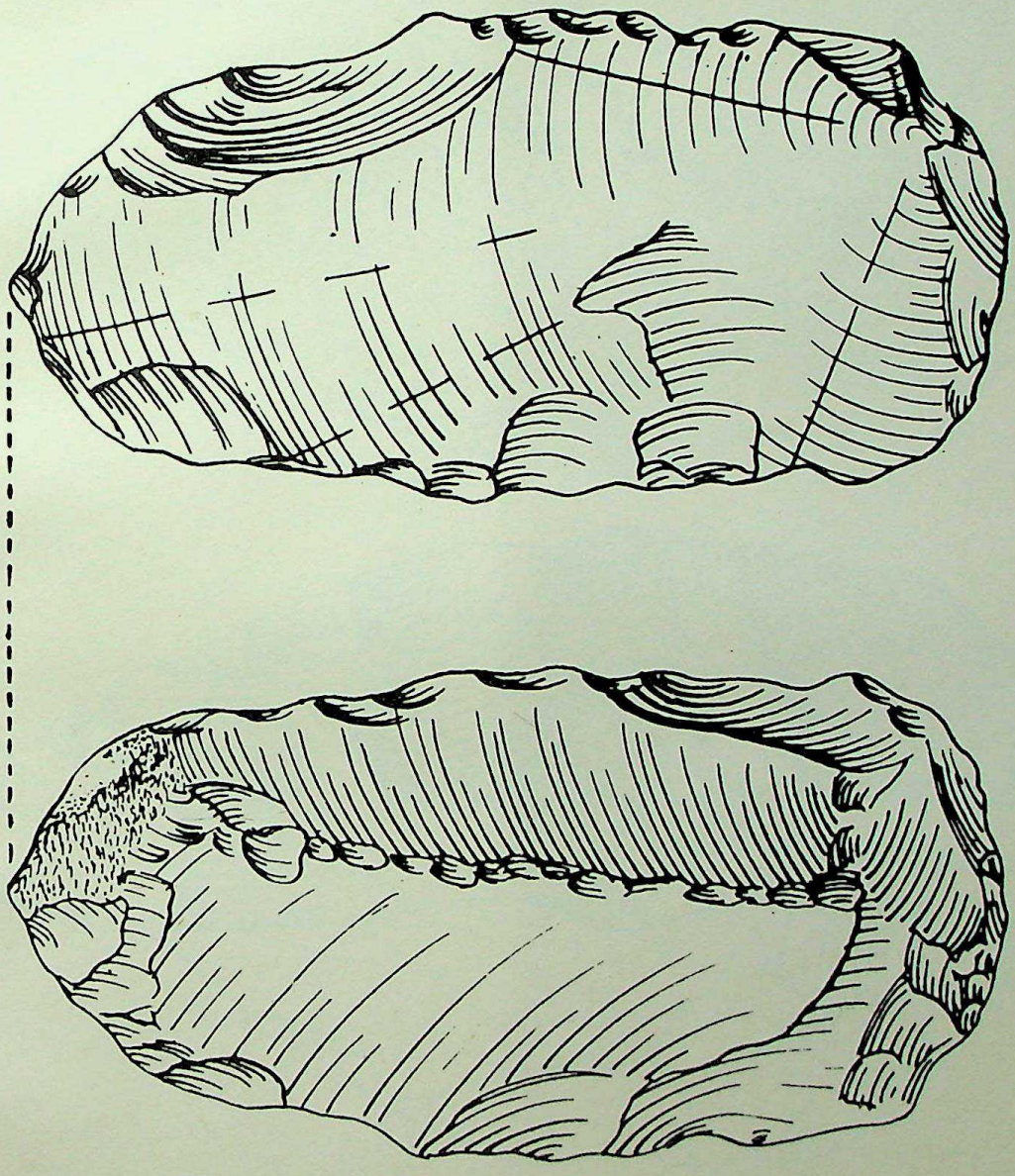
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XXVIII



Double-sided Side-scraper on flake : GJI—2

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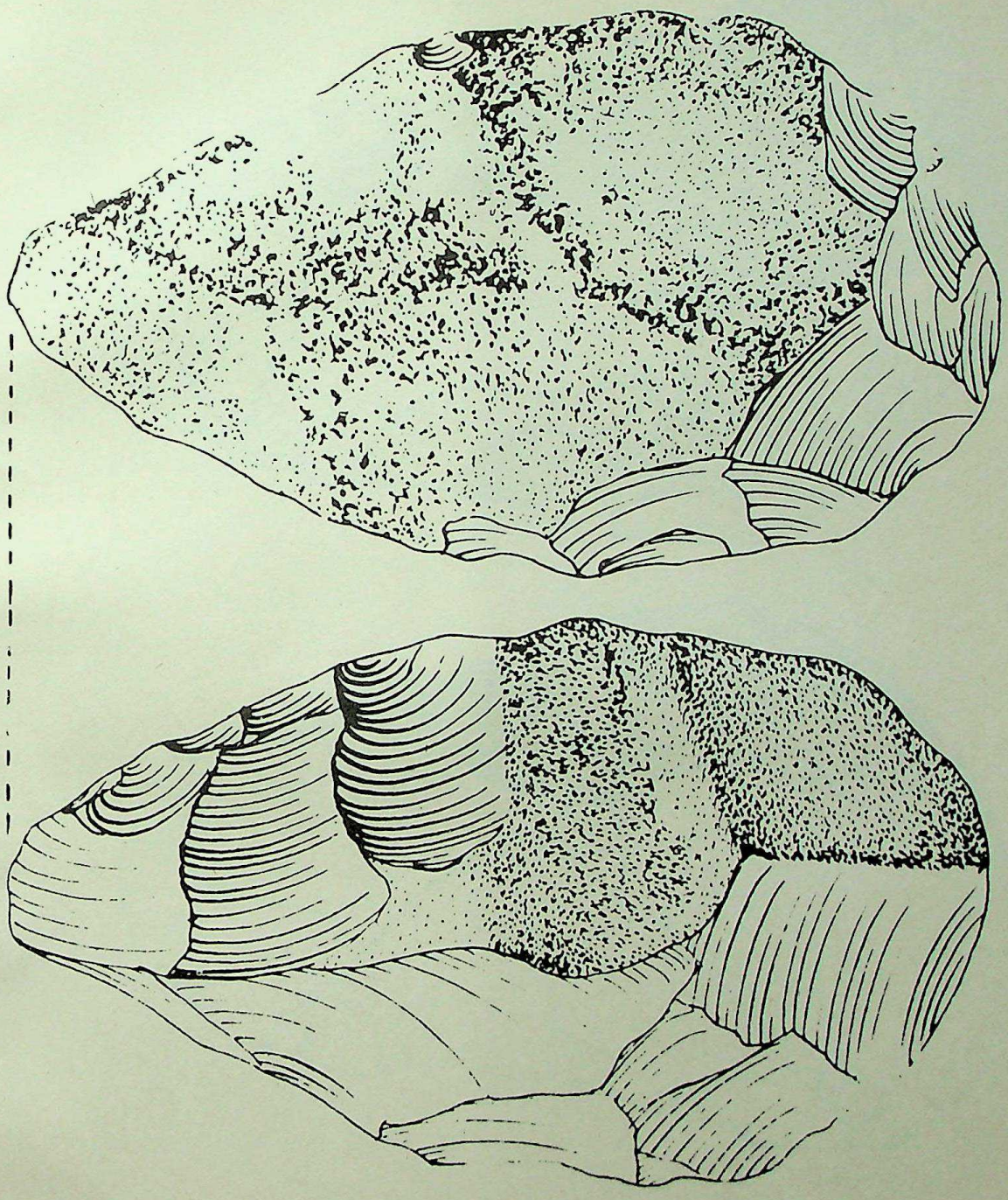
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XXIX



Almond-shaped handaxe on core : MRA—19

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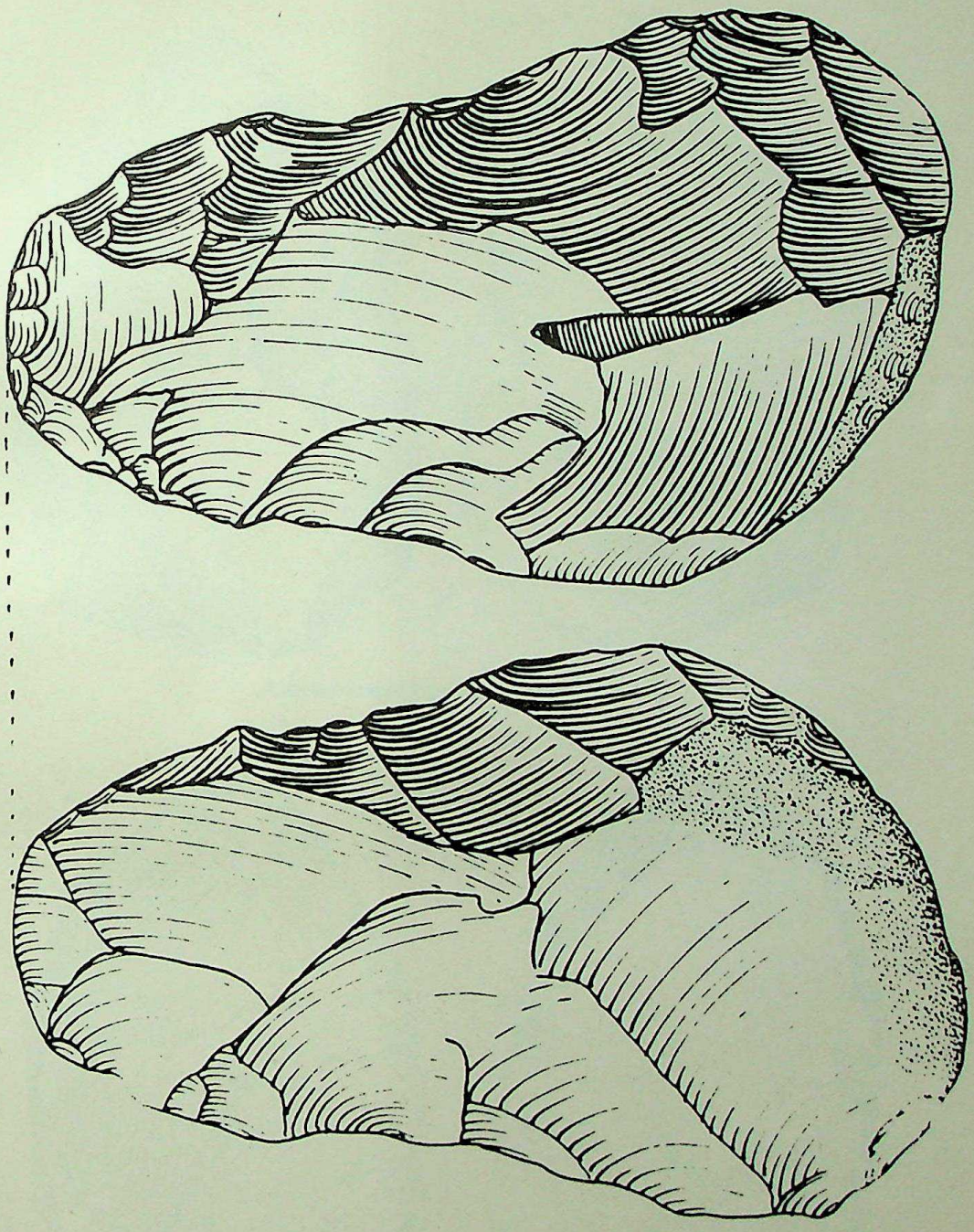
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate xxx



Pear-shaped handaxe on core : STA—2

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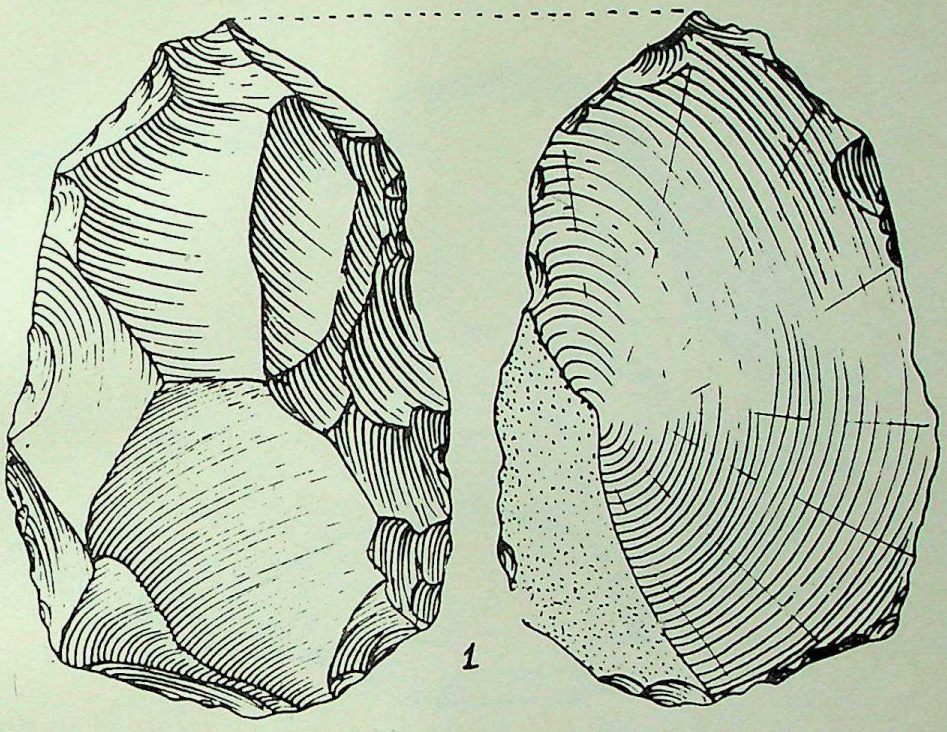
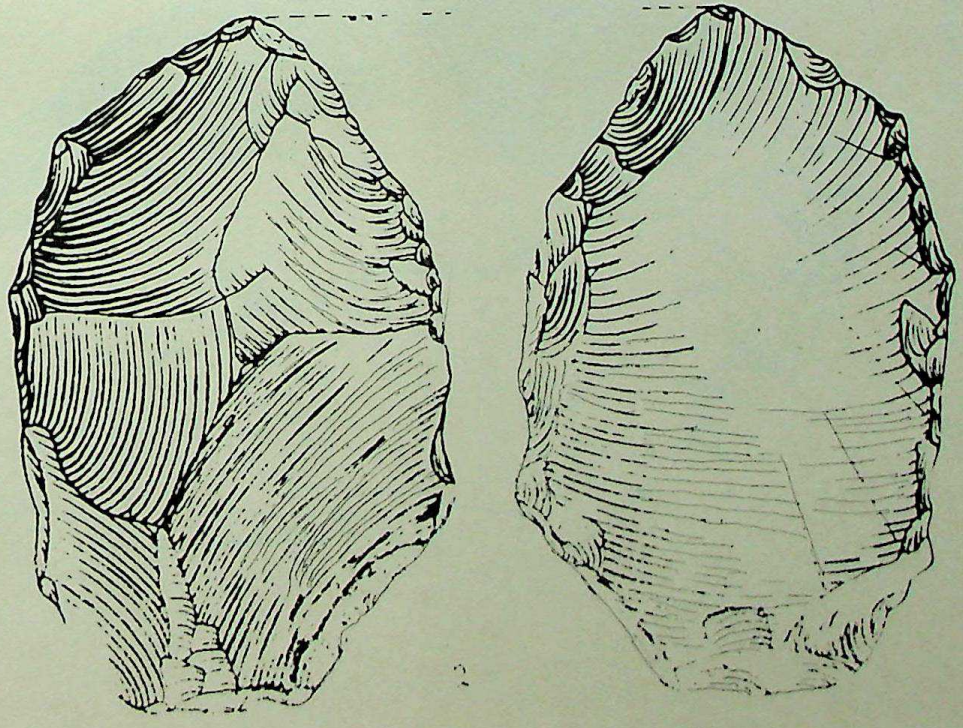
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XXXI



Almond-shaped handaxe on flake : SHL—21



Oval-shaped handaxe on flake : BCA—2

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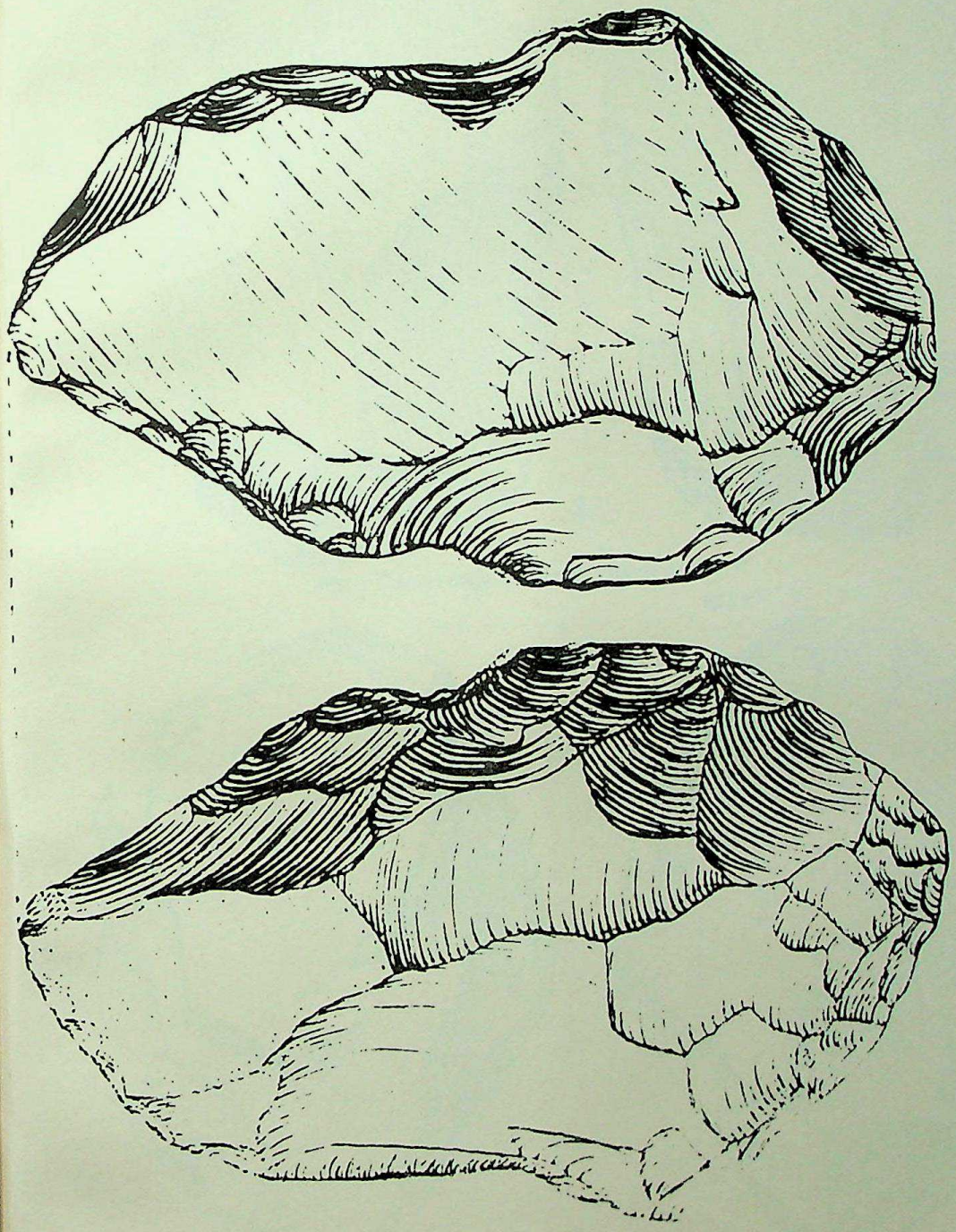
Plate XXXII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



Bi-conical handaxe on flake : GJI—1

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

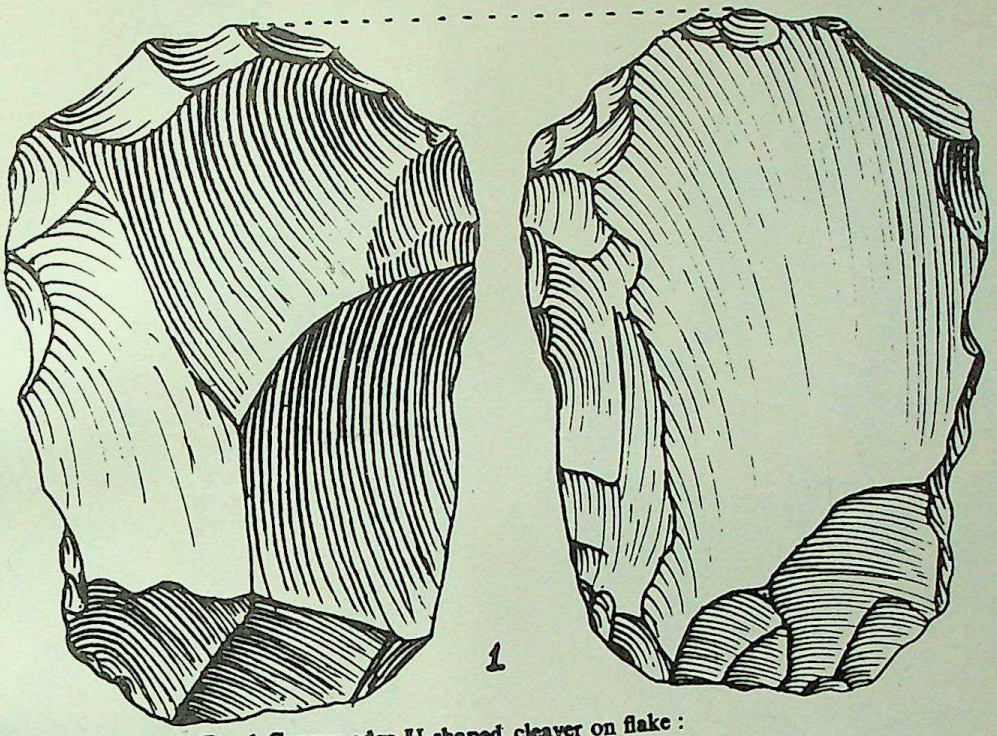


Fig. 1 Convex-edge U-shaped cleaver on flake :
BJI—1

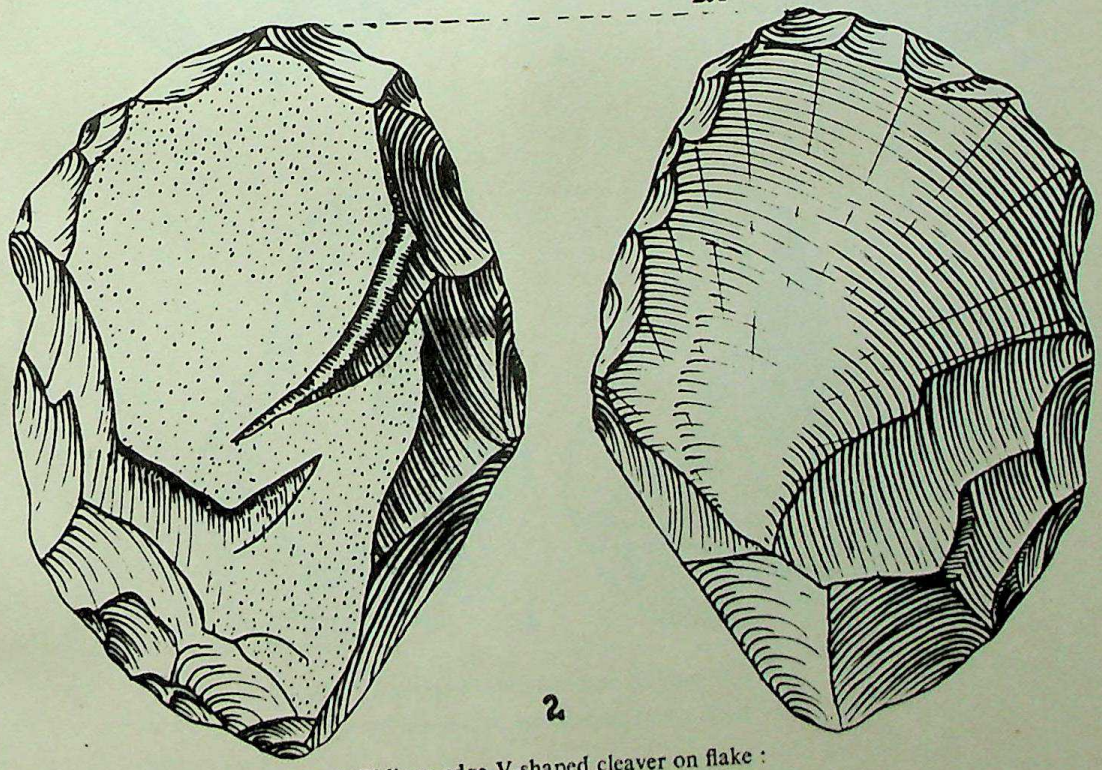


Fig. 2 Oblique-edge V-shaped cleaver on flake :

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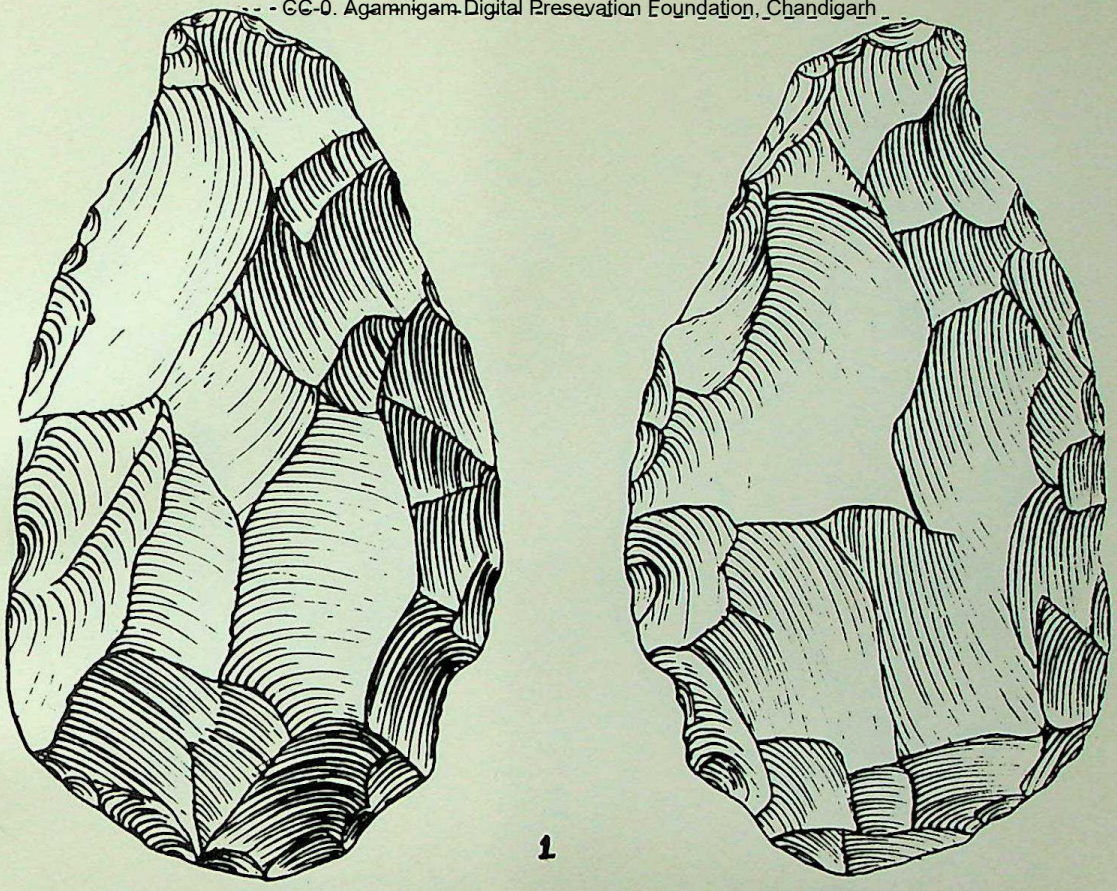
Plate . X : 4

CC-0. Agamnigam Digital Preservation Foundation, Chandigarh



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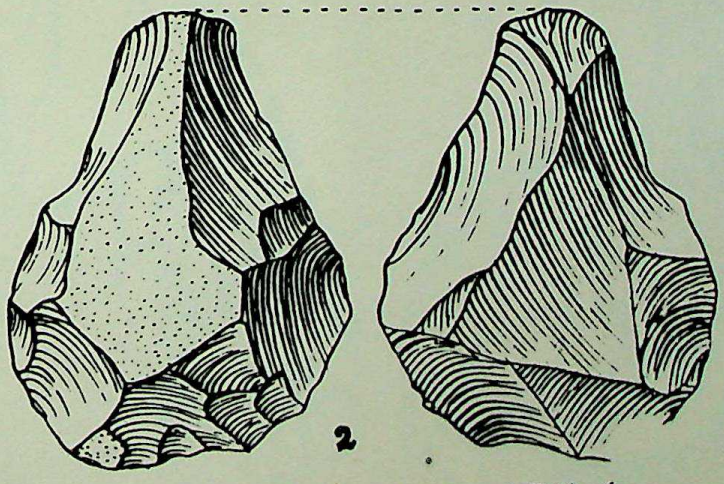

2

Fig. 1 Almond-shaped handaxe on core :PNA—4

Fig. 2 Pear-shaped handaxe on core : HRA—4

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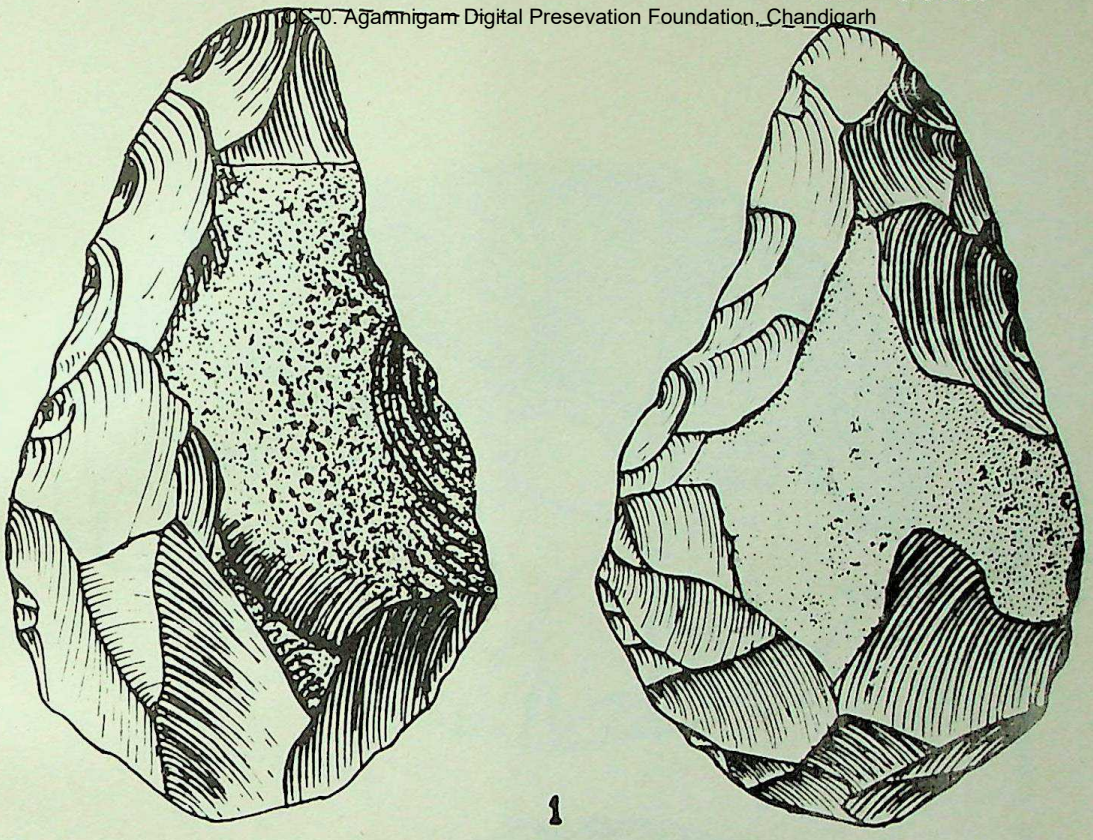
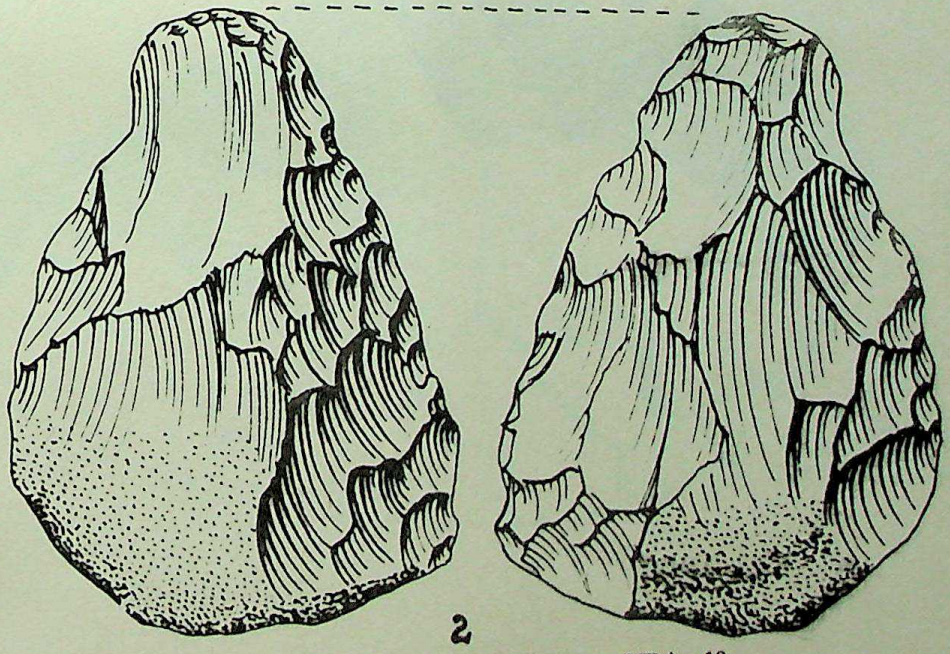
Plate XXXV

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



1



2

Fig. 1 Pear-shaped handaxe on core : MRA—18

Fig. 2 Triangular handaxe on core : SHL—52

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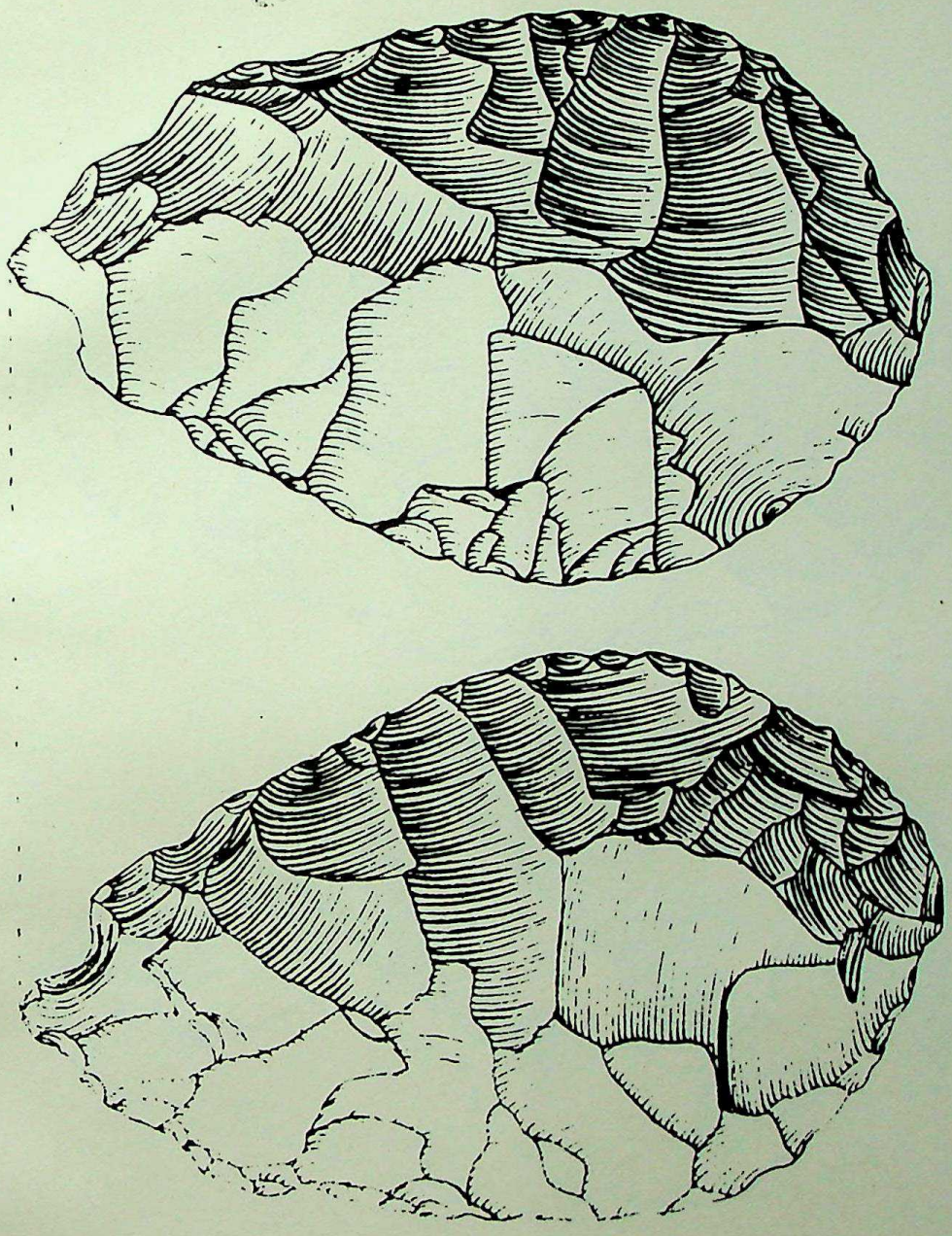
Plate xxxvi

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



Elongated Oval-shaped handaxe on core : PNA—10

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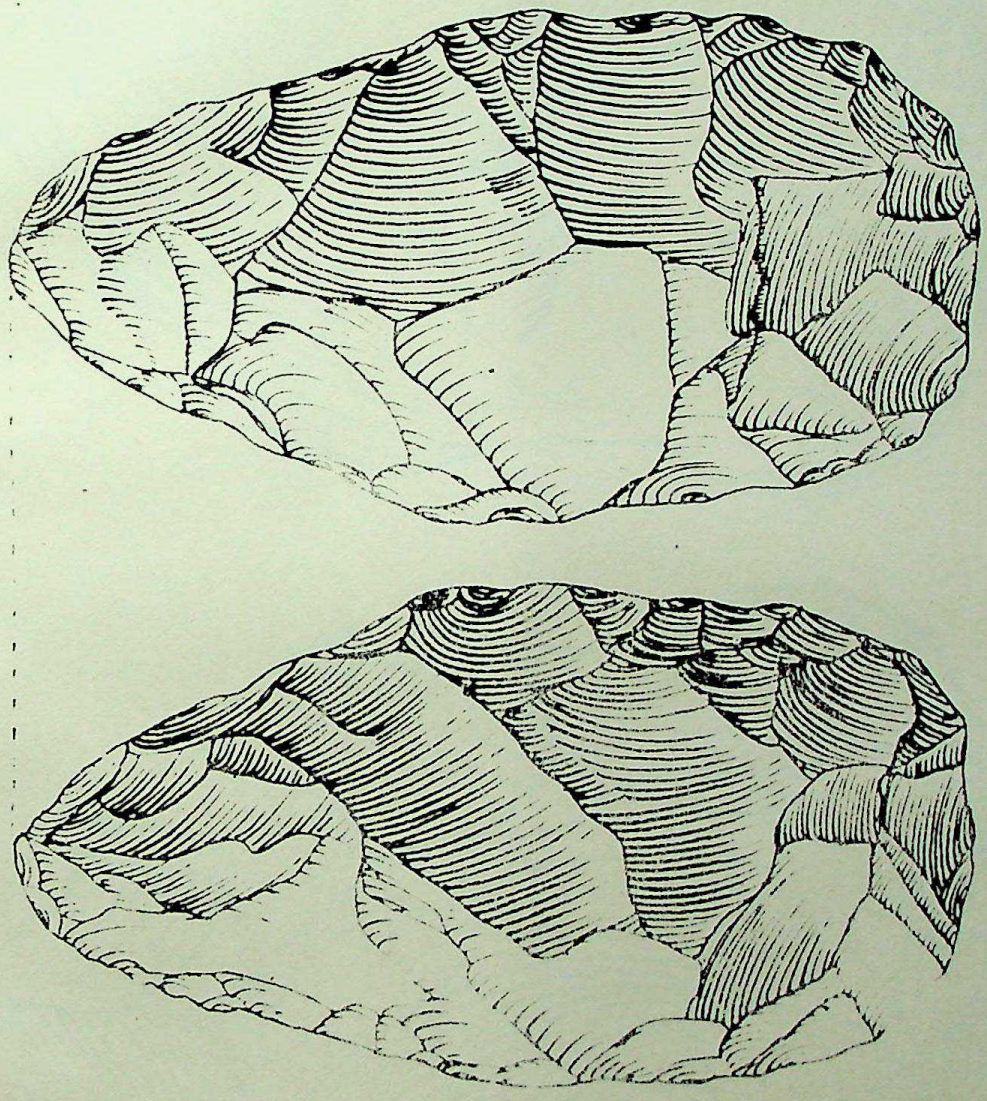
Plate xxxviii

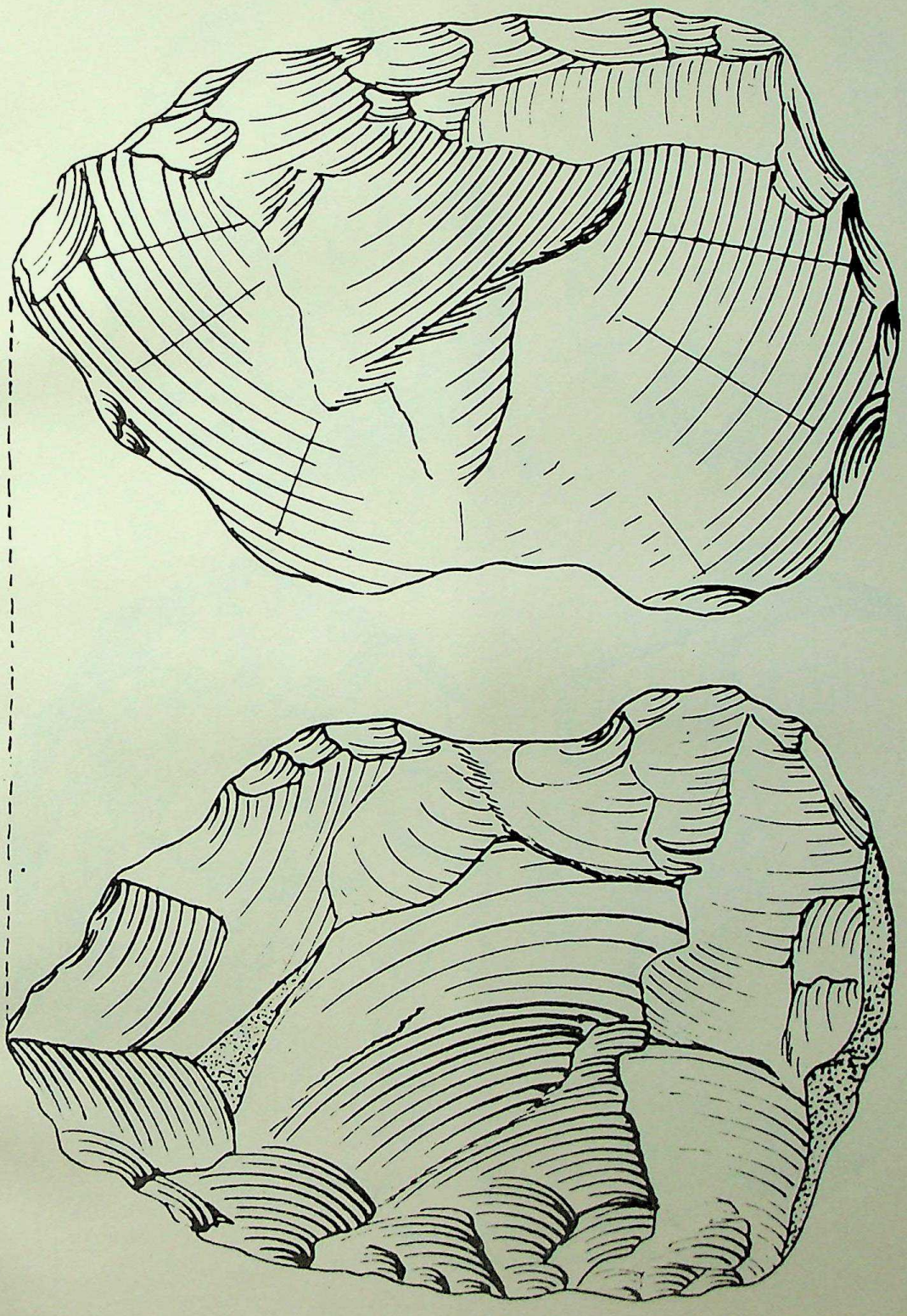
CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



CC-0. Agamnigam Digital Presevation Foundation, Chandigarh

Plate XXXVIII

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



Triangular handaxe on flake : MKY(11)—2

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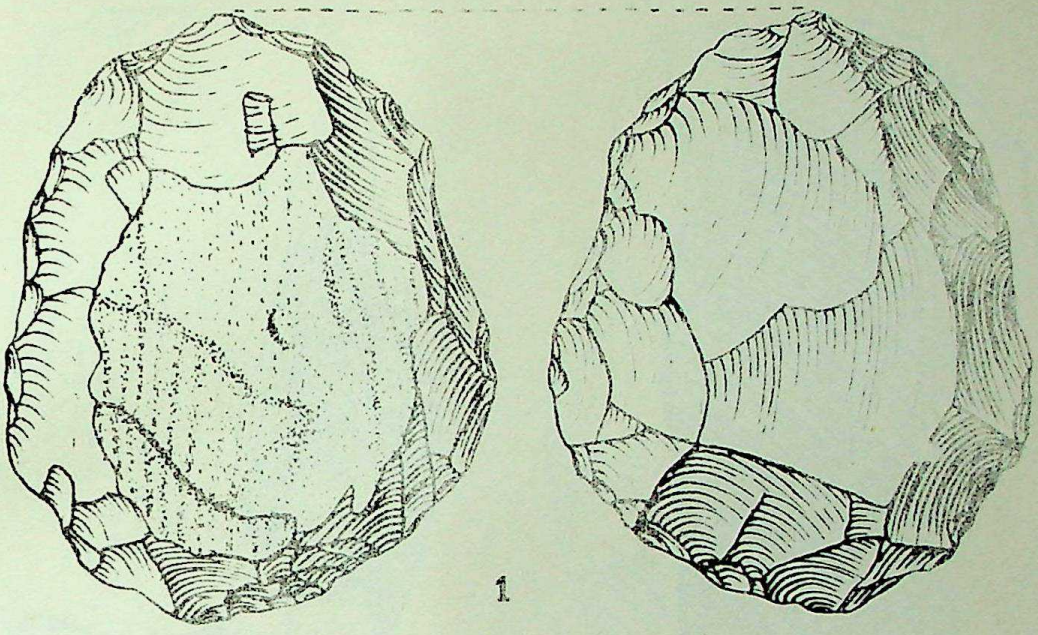
Plate XXXIX

CC-0. Agamnigam Digital Presevation Foundation, Chandigarh



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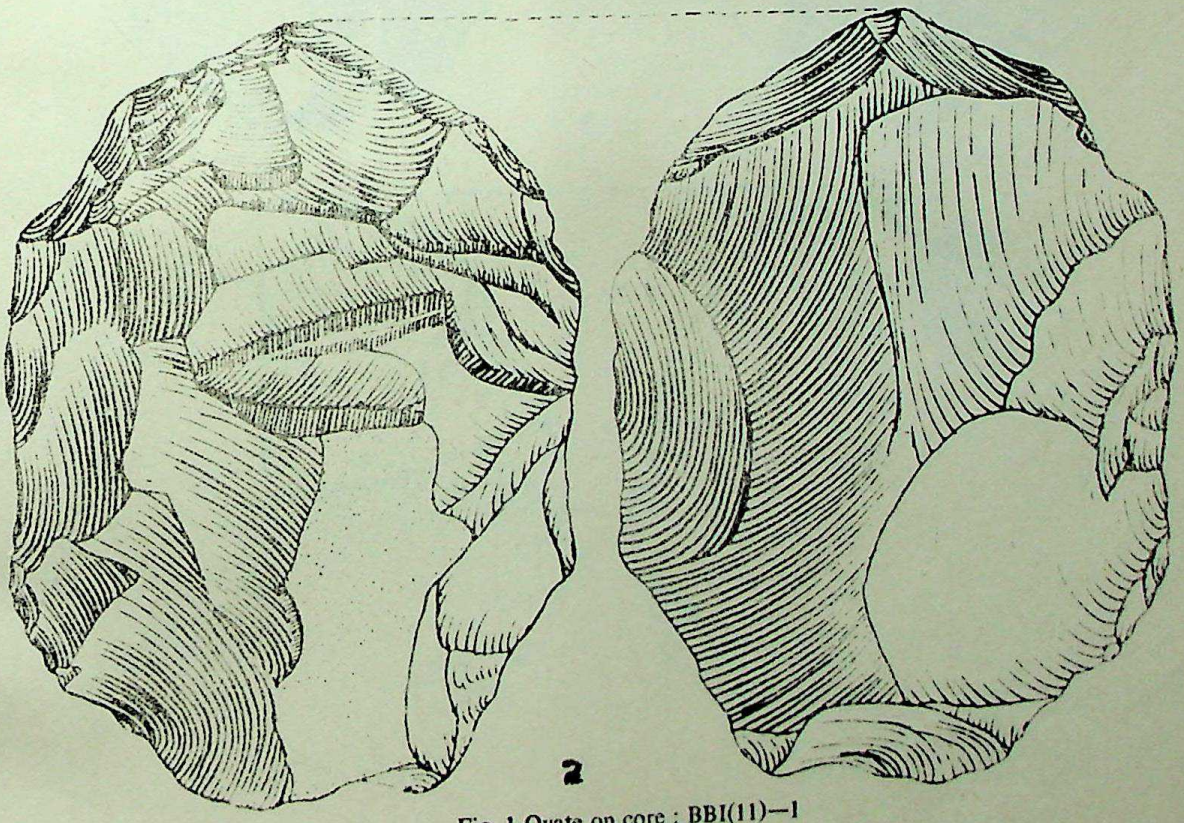

2

Fig. 1 Ovate on core : BBI(11)—1

Fig. 2 Ovate on flake : BSA(11)—3

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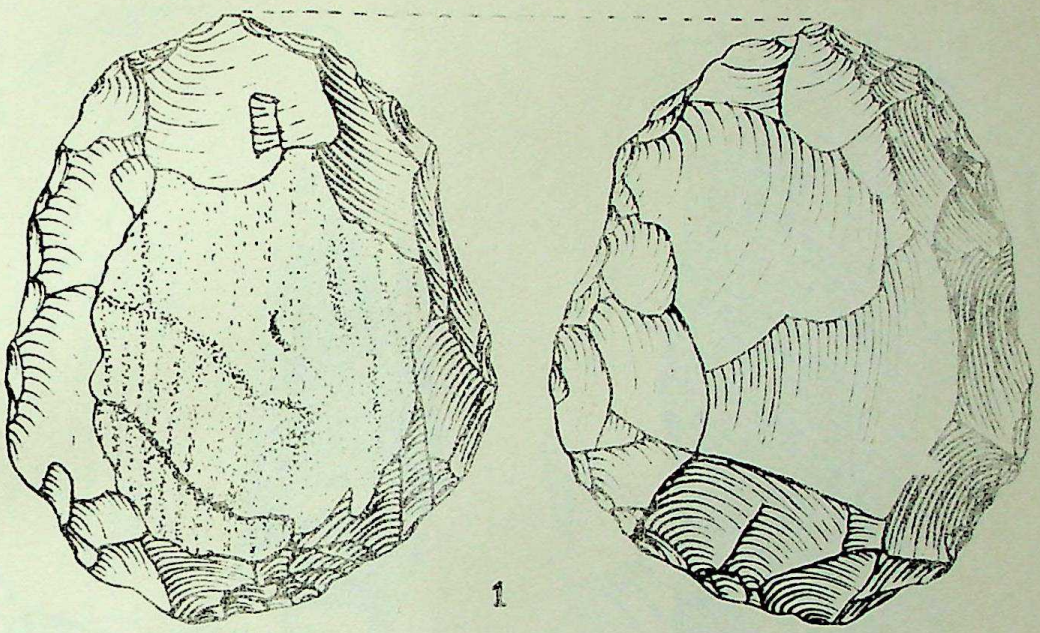
Plate XXXIX



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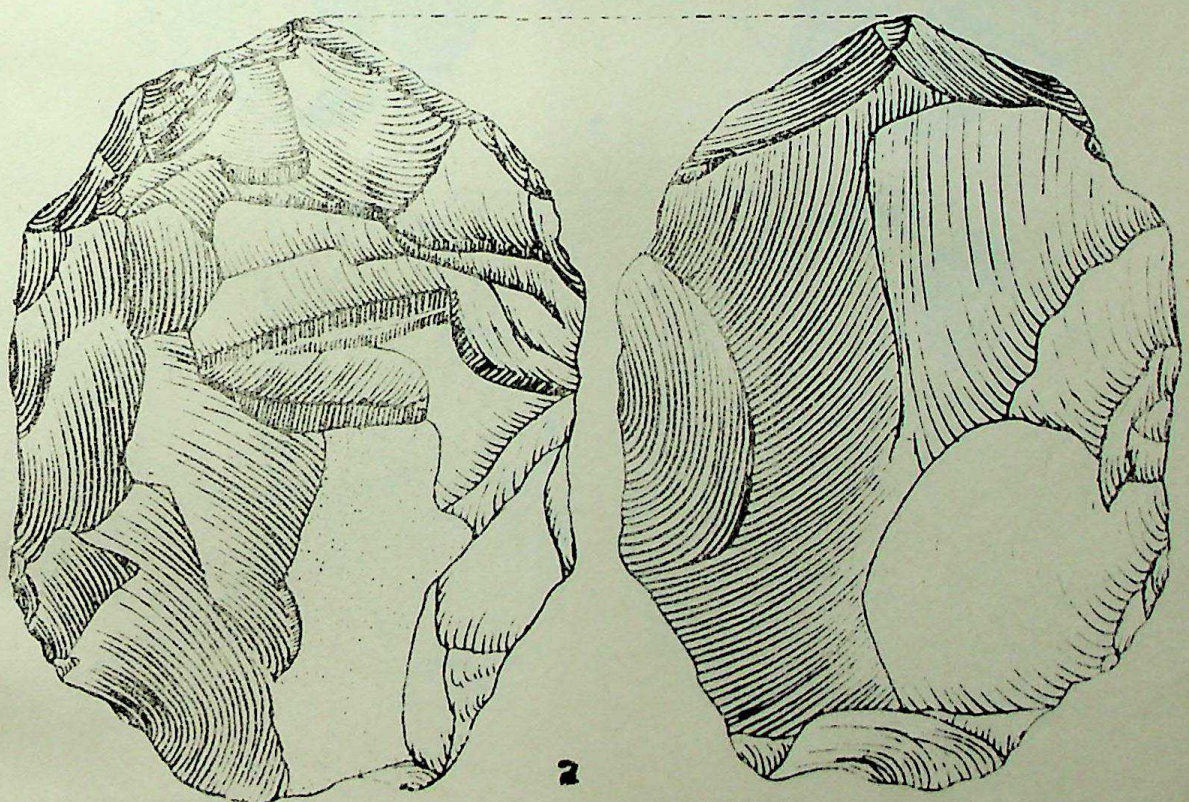

2

Fig. 1 Ovate on core : BBI(11)—1

Fig. 2 Ovate on flake : BSA(11)—3

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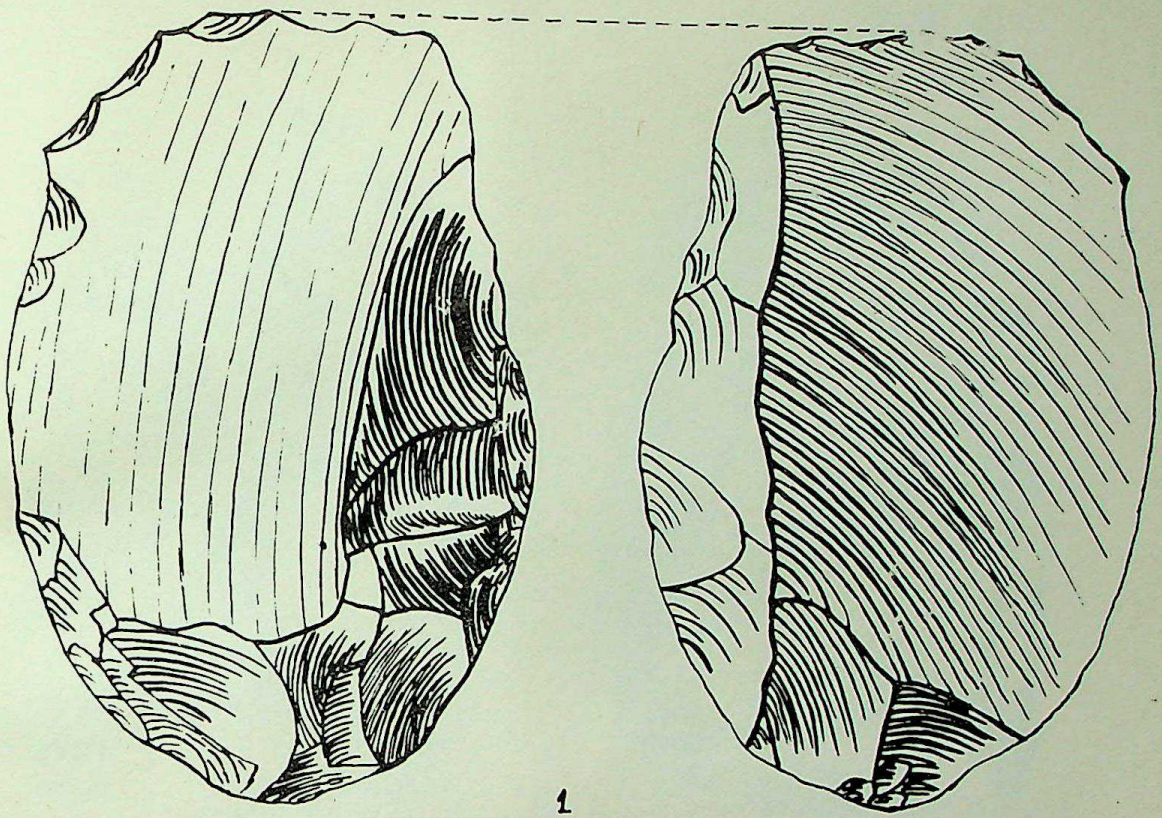
Plate XL



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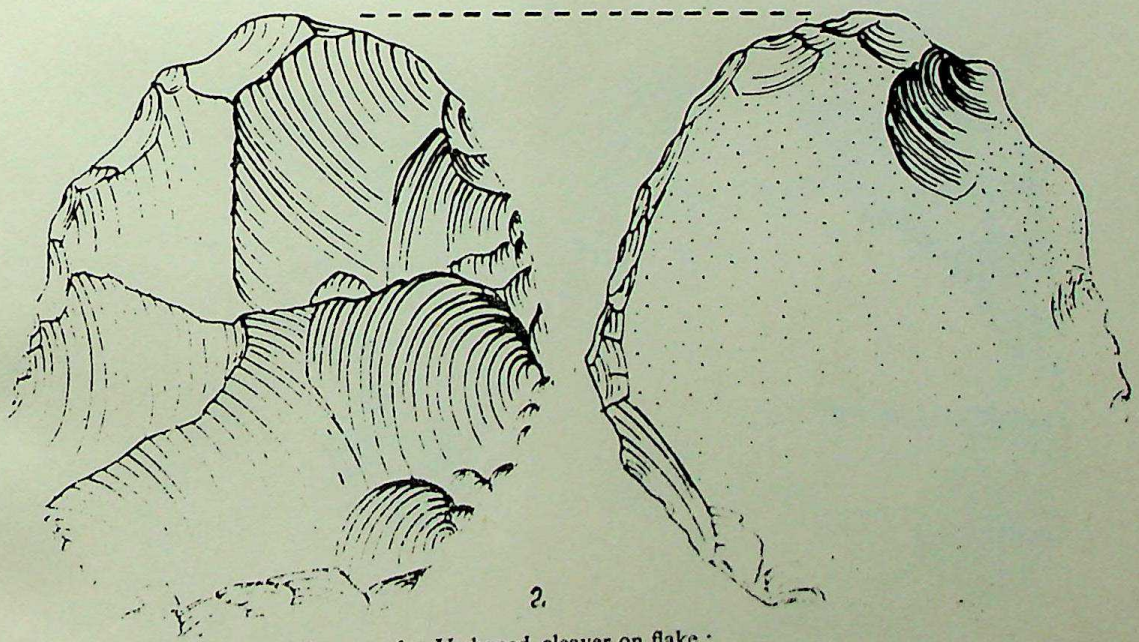

2.

Fig. 1 Convex-edge U-shaped cleaver on flake :

AOI—2

Fig. 2 Disc-shaped side-scraper on core : RNR—4

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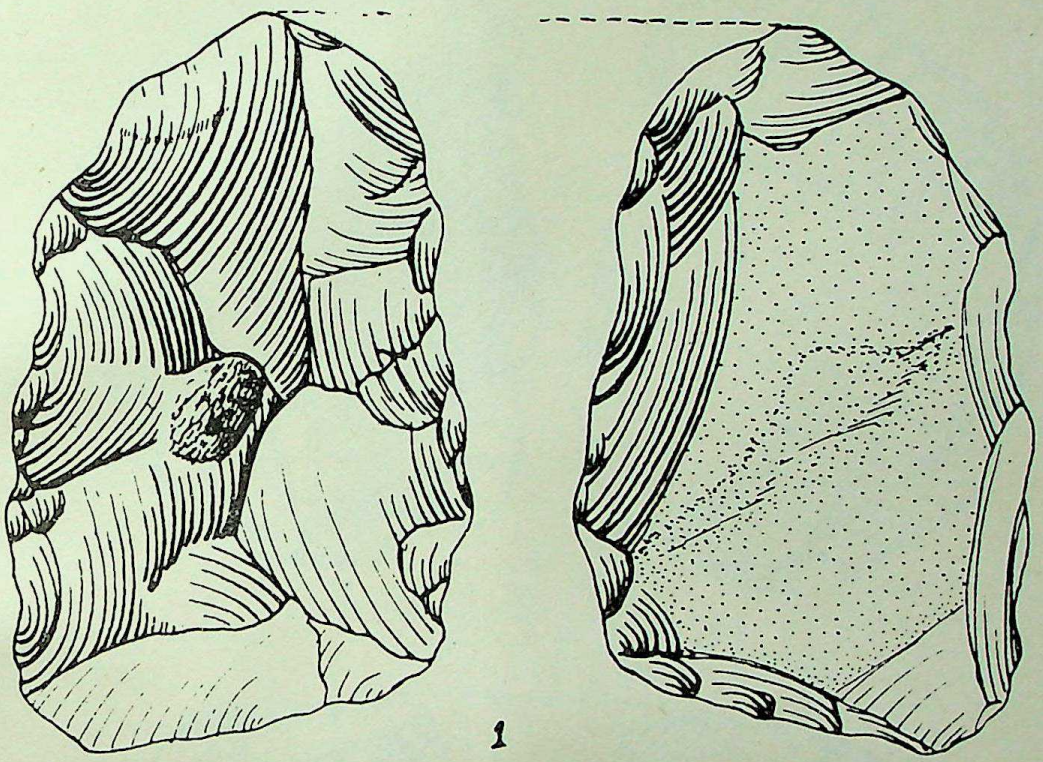
Plate XLI



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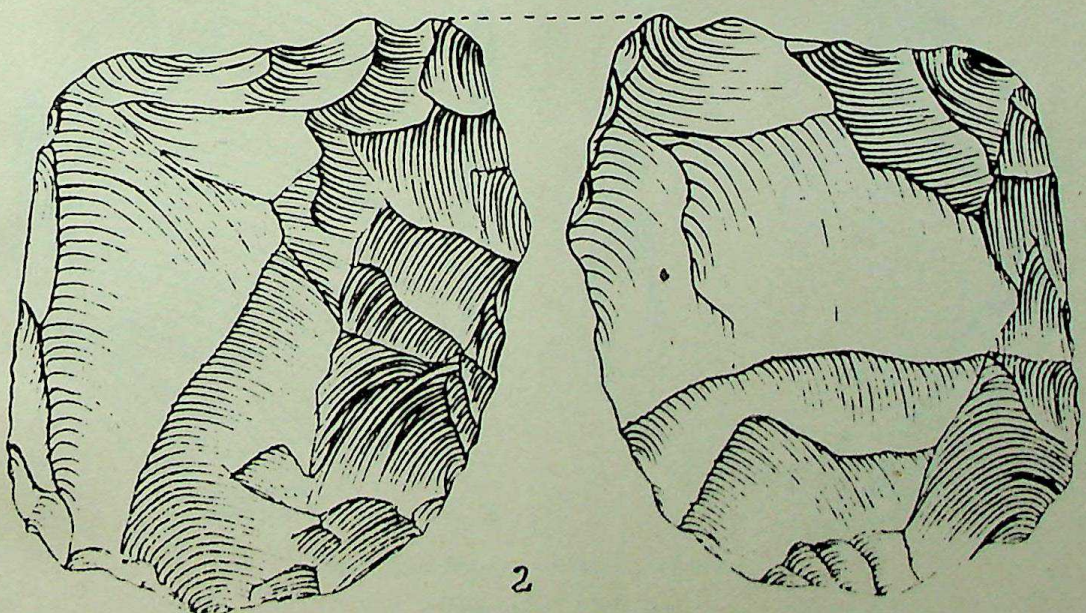

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Fig. 1 Double-sided side-scraper on core : SHL—7

Fig. 2 Round-scraper on core : SHL—179

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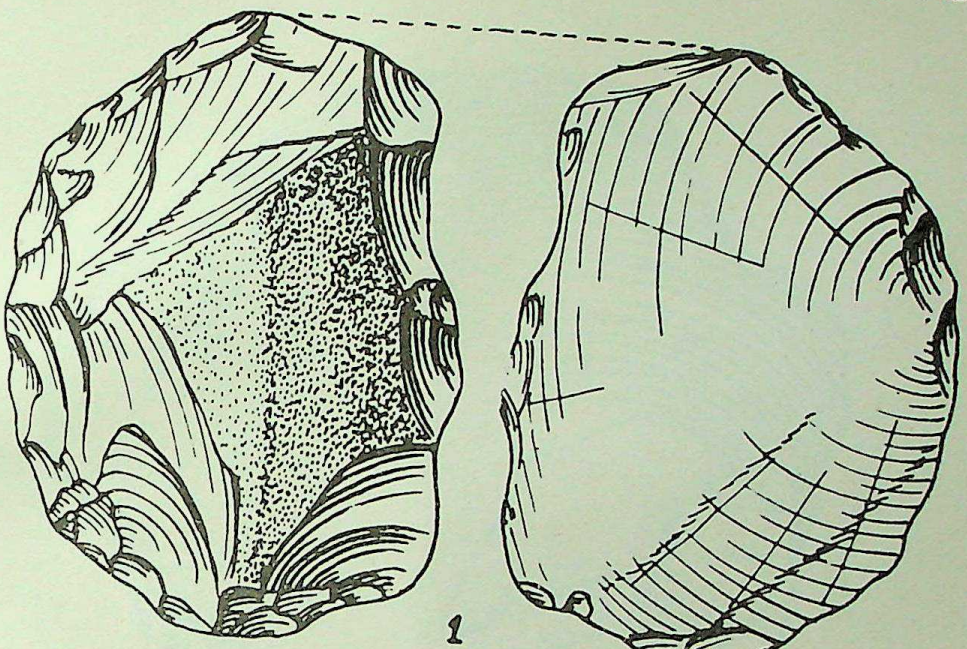
Plate XLII



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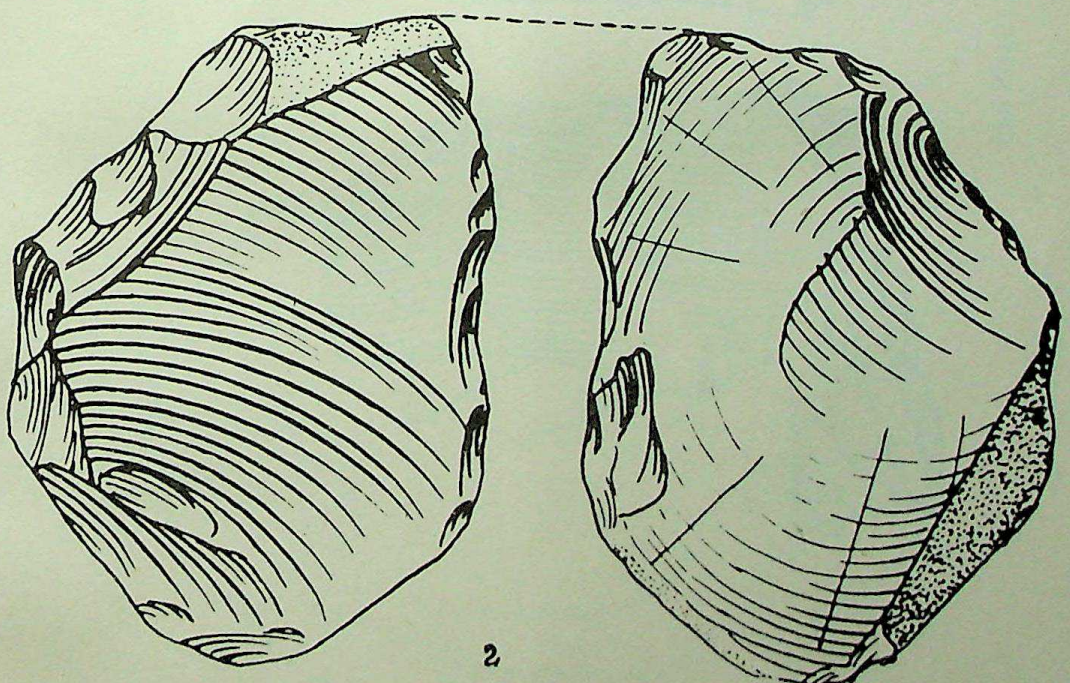

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Fig. 1 Side Scraper on flake : STA—4

Fig. 2 Side flake : RNR—5

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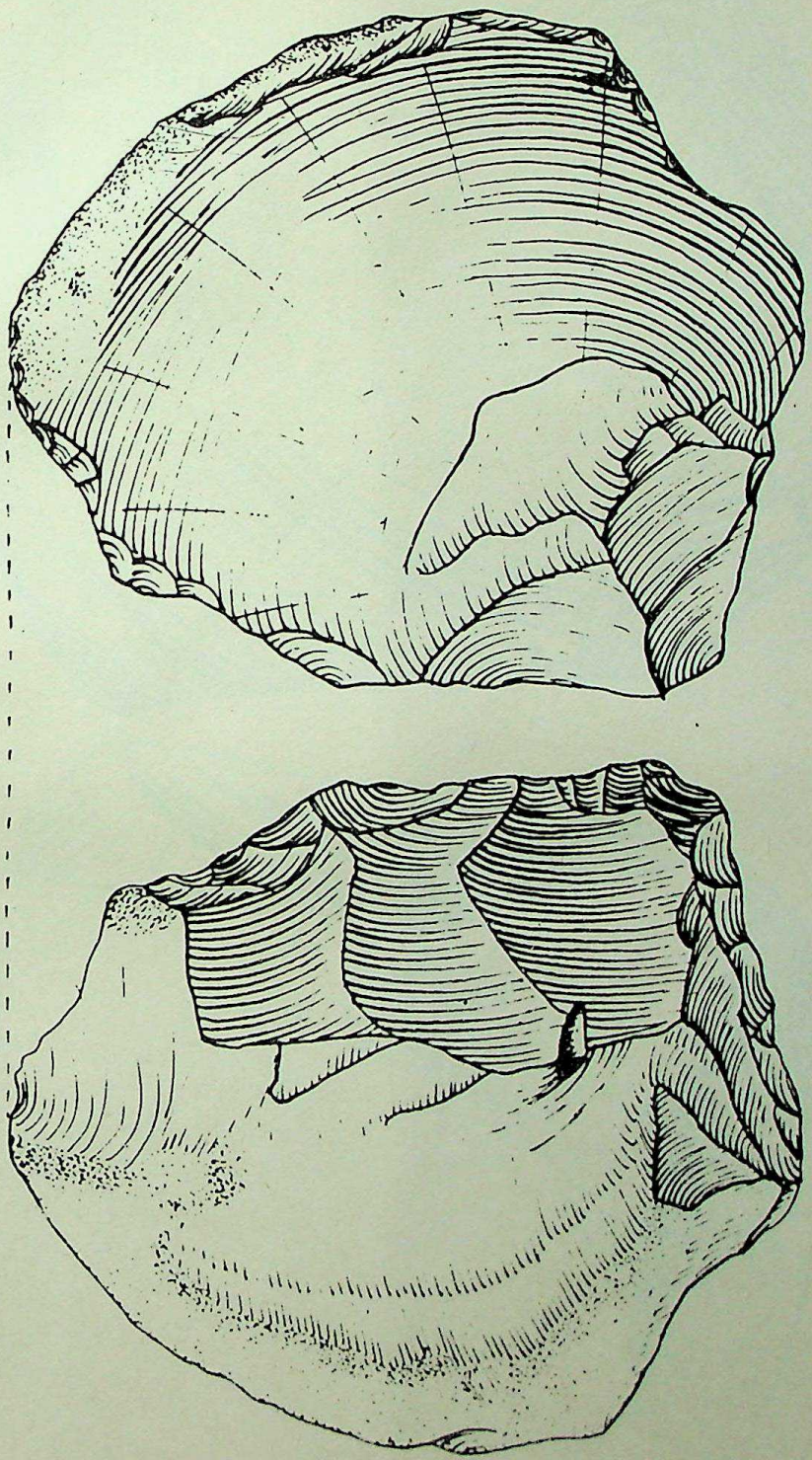
Plate XLIII



End Flake : HHI –1

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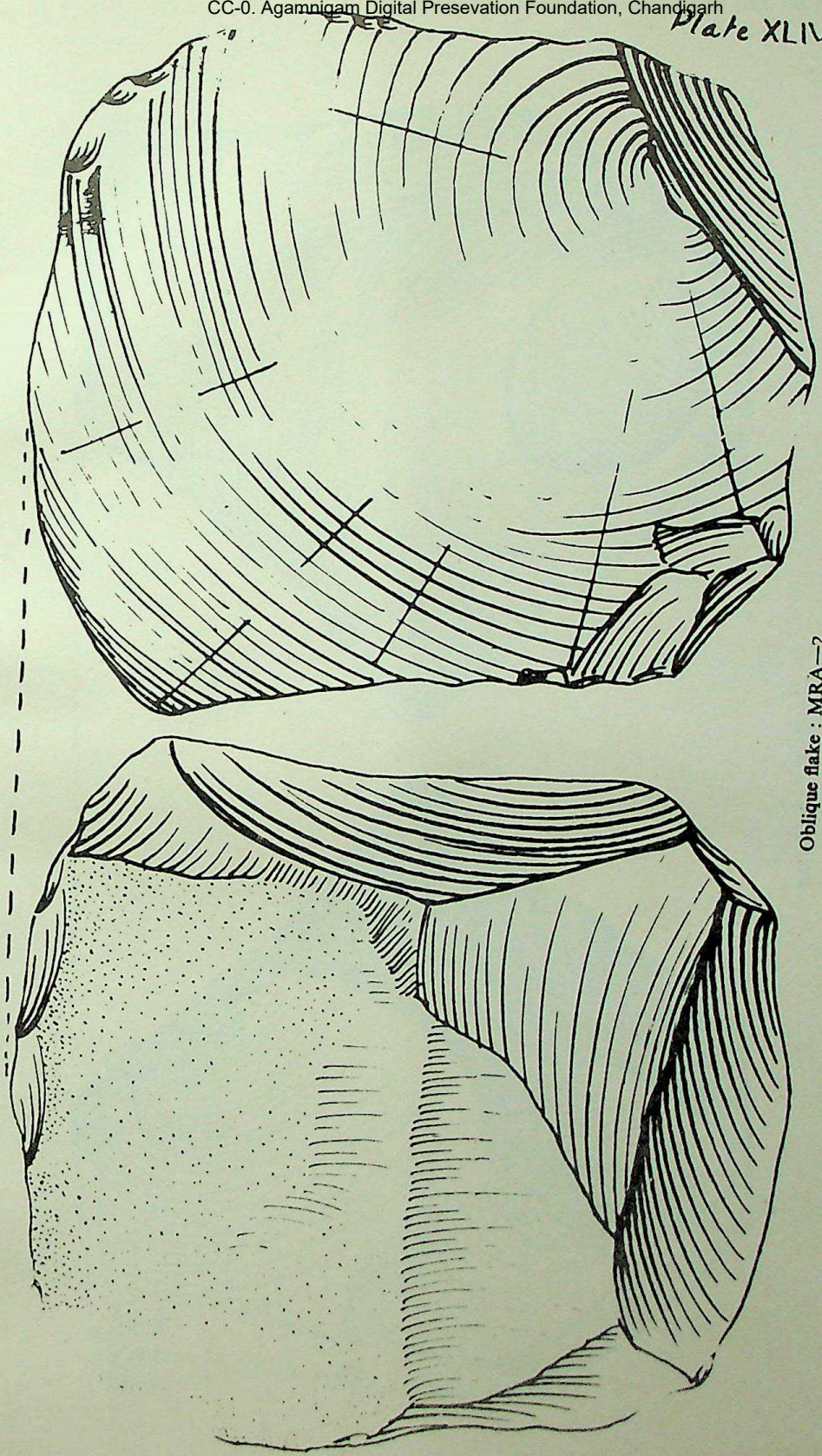
Plate XLIV



Oblique flake : MRA—2

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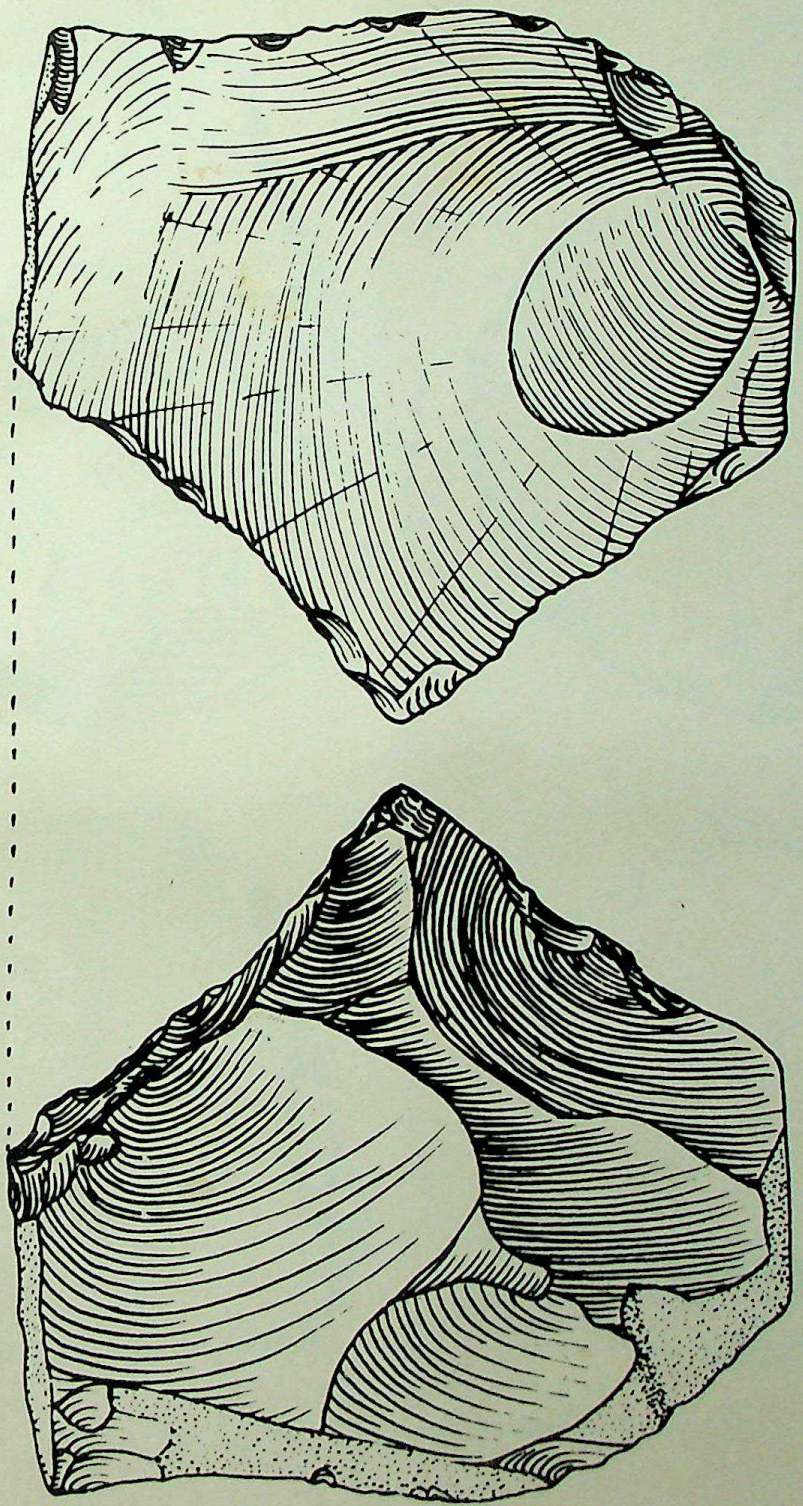

End Flake : SHL—12

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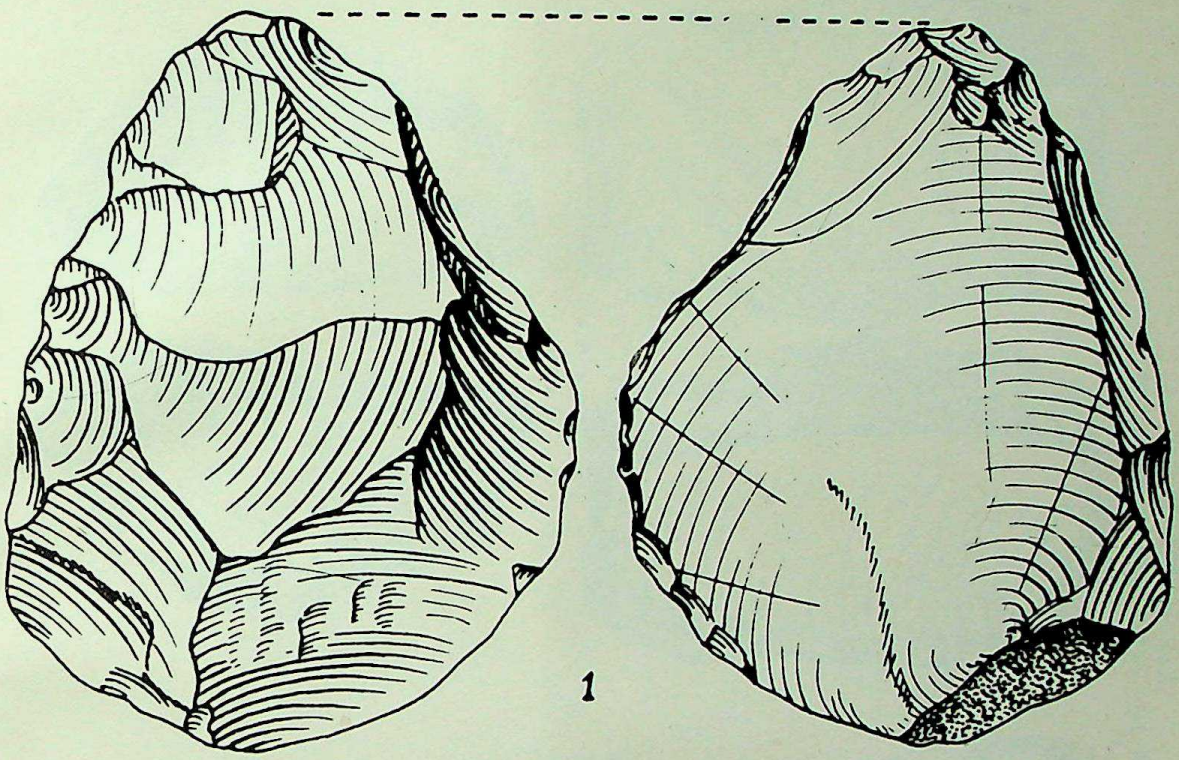
Plate XLVI



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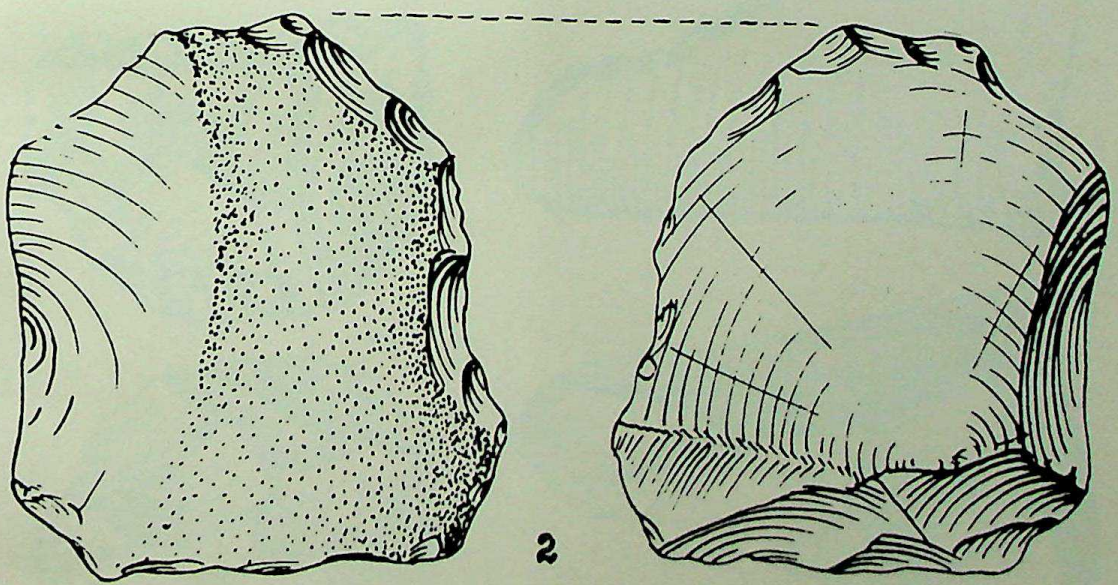

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Fig. 1 End Flake : MJA—1

Fig. 2 Faceted platform flake : LWR—1

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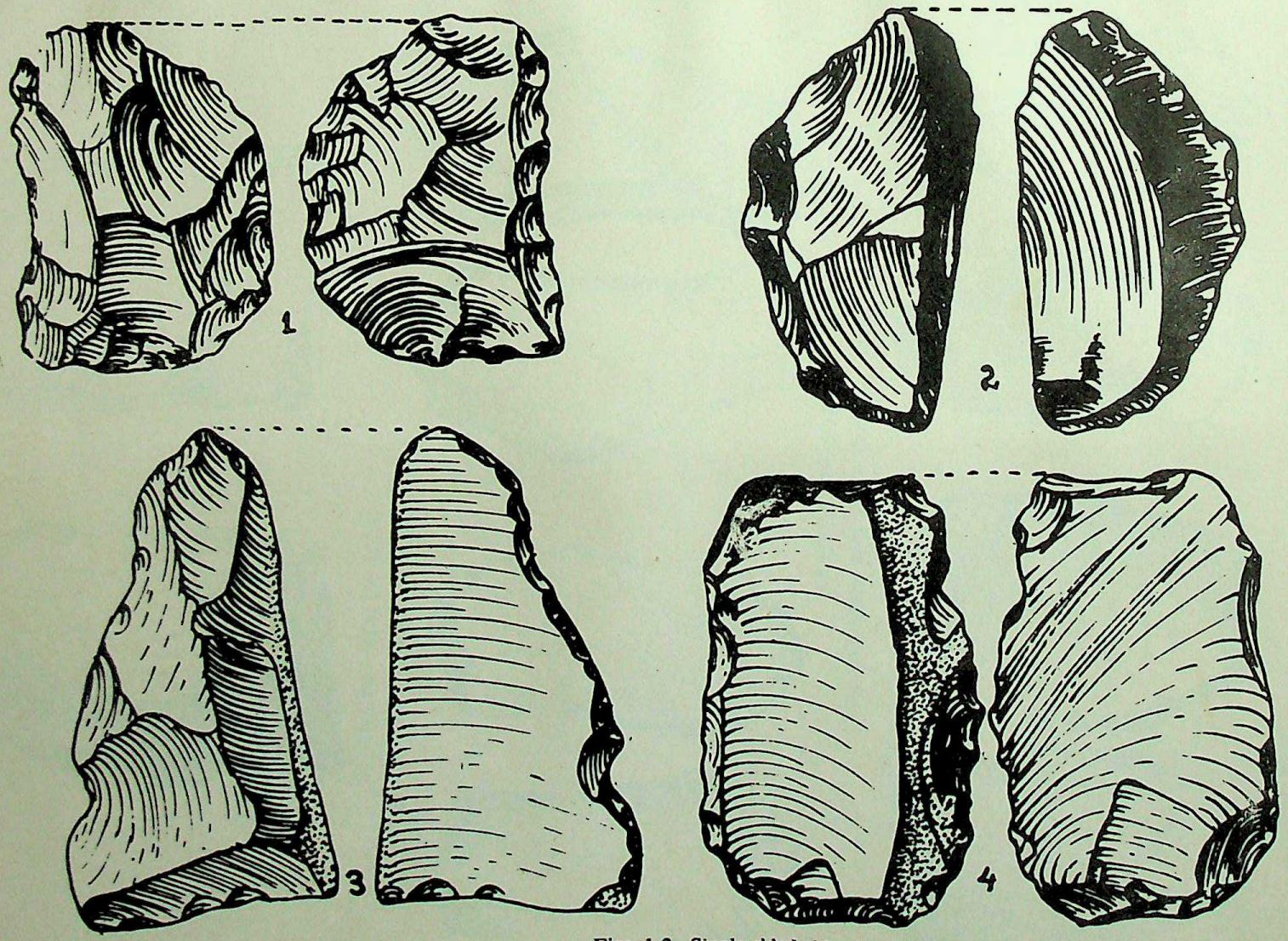

Figs. 1-2 Single-sided side scrapers on core : KPR—5; BSI—27

Figs. 3-4 Single-sided side scrapers on flake : BHI—6; GTA—3.

Plate XLVII

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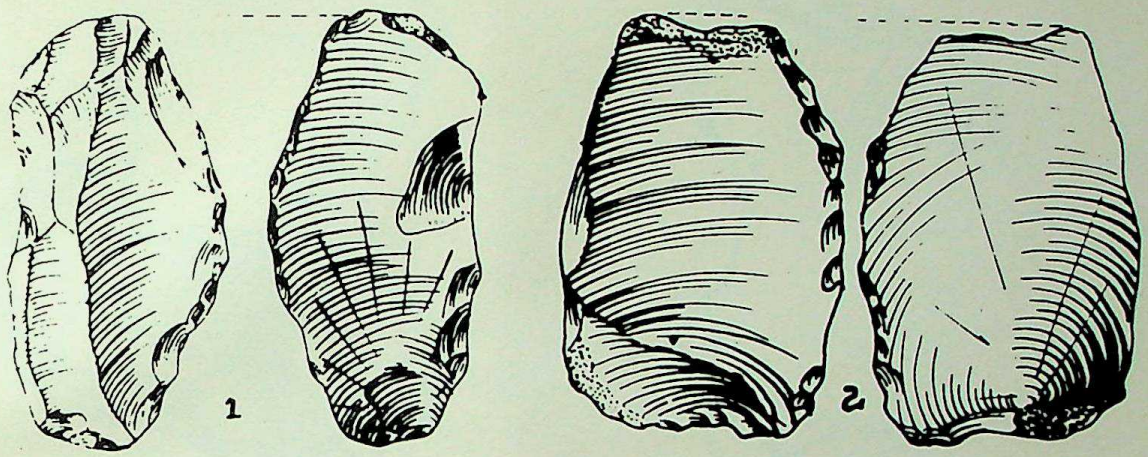
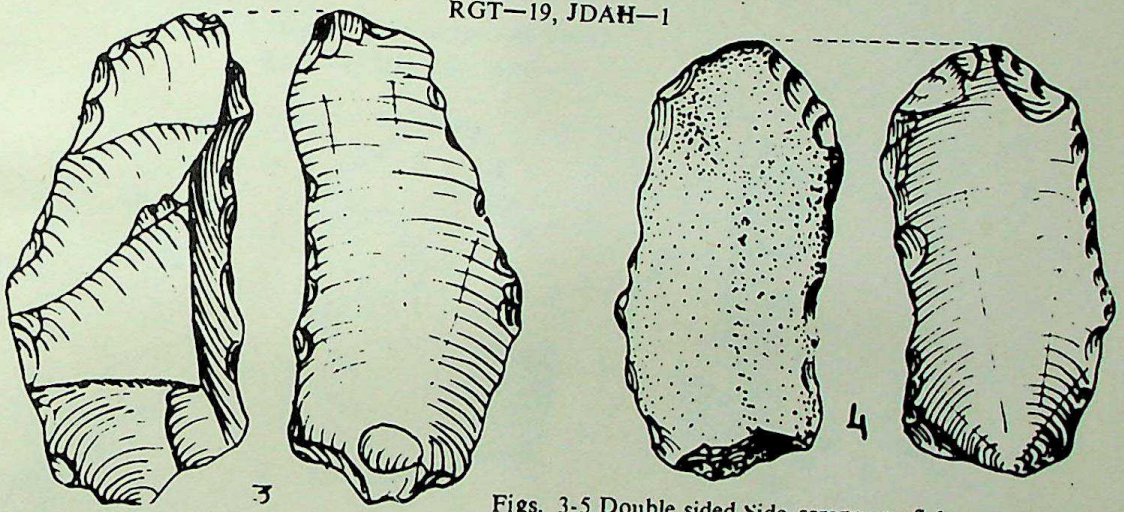
Plate XLVIII



Figs. 1-2 Single-sided Side scrapers on flake :
RGT—19, JDAH—1



Figs. 3-5 Double sided Side scraper on flake :
KRP—9; BGR—30; SHL—67

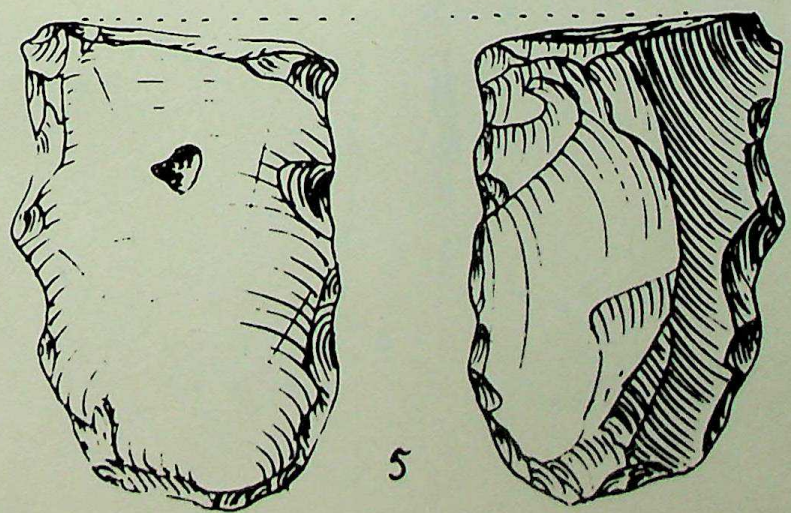


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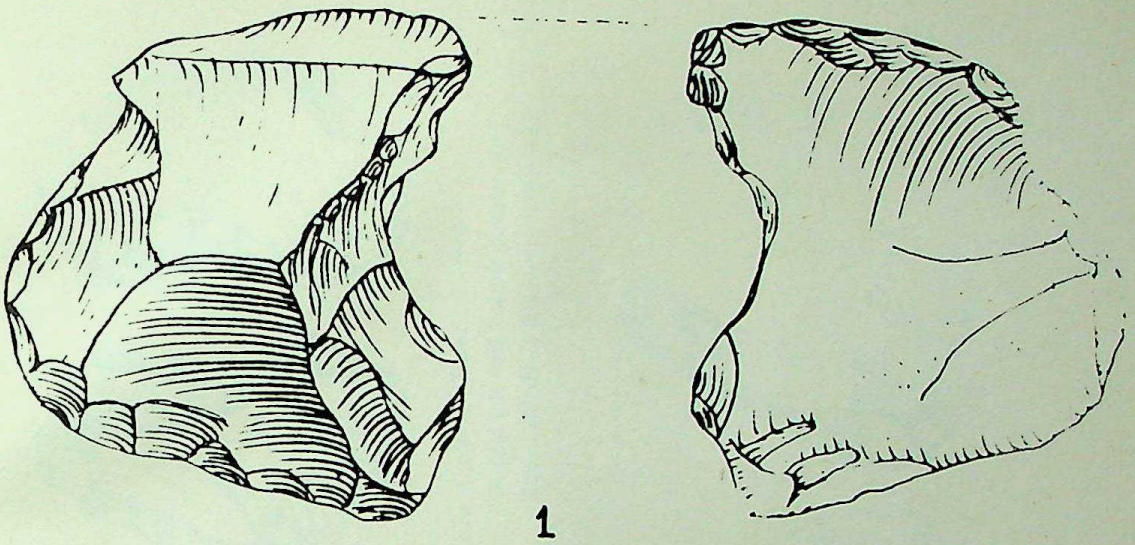
Plate XLIX



Figs. 1-2, 4 Single hollow acrapers on flake :
RNN–1; SHL–69; DRA–3

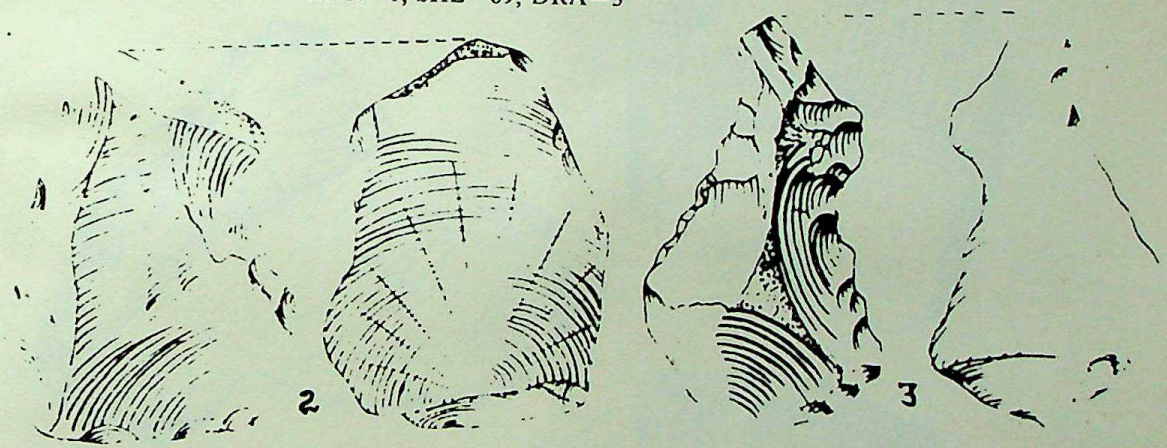


Fig. 3 Double hollow scraper on flake :
SDL–49

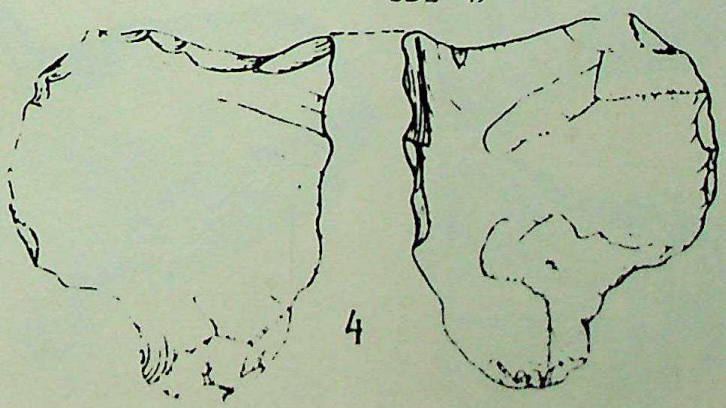


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Fig. [illegible] scraper on Flake : SR1—4

Figs. 1-4 Simple side and hollow scrapers on flake : JDAH-3; BHI—10; DRA—13

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Plate LI

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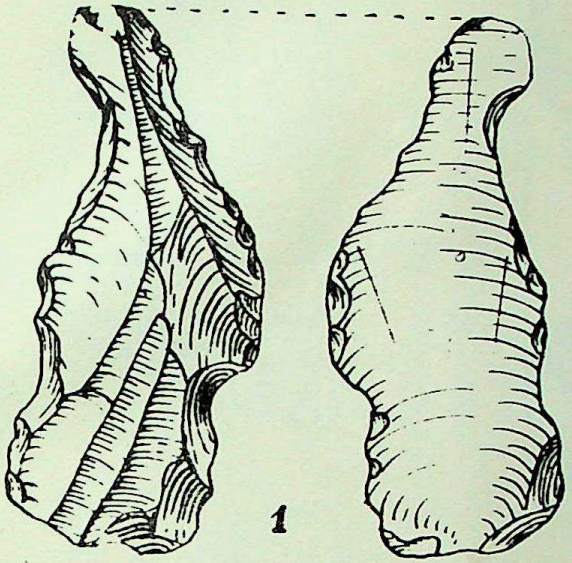

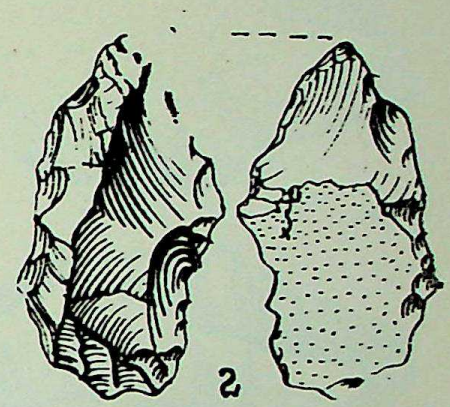

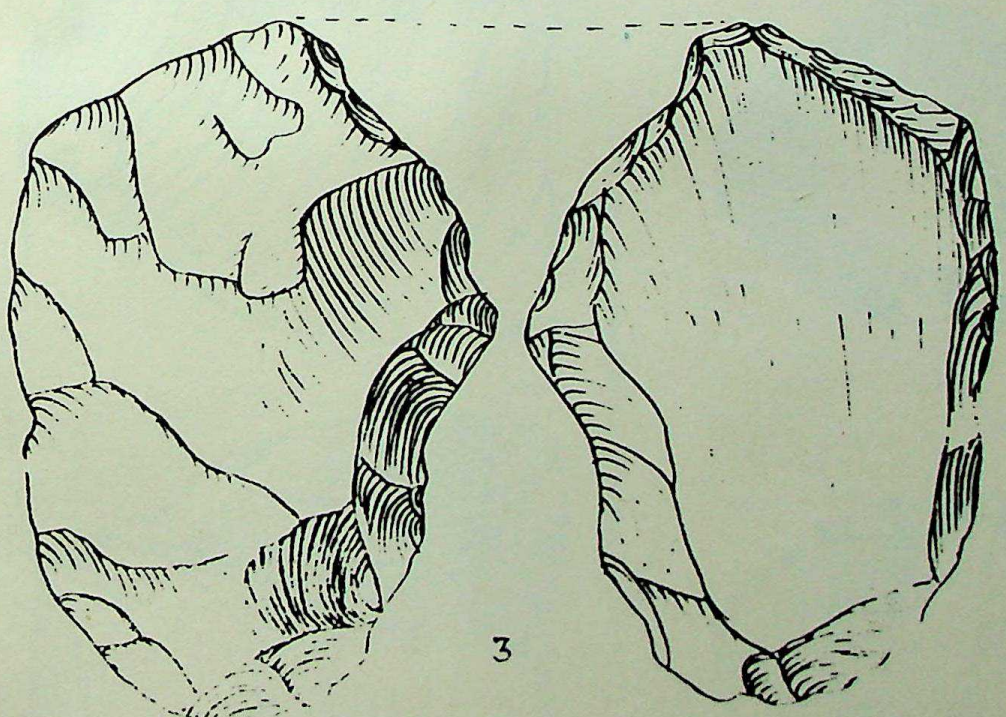

Fig. 1 Tanged side and hollow scraper on blade :

RGT—7

Figs. 2-3 Side hollow and End Scrapers on core :

SDL—55; SHL-26

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Plate LII

Fig. 2 Single sided Side and End Scraper on Flake :
SDL – 62

Fig. 3-4 Single sided Side and End Scraper on Galeruca Shale Flake : MKY(1)—10;
ITA 3

Fig. 1 Side, Hollow and End Scraper on Flake :
ITK–1

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Plate LIII

Fig. 1 Double-sided Side & End Scraper on Flake: BCA—31

Fig. 2 Double-sided Side & End Scraper on Core : BCA—30

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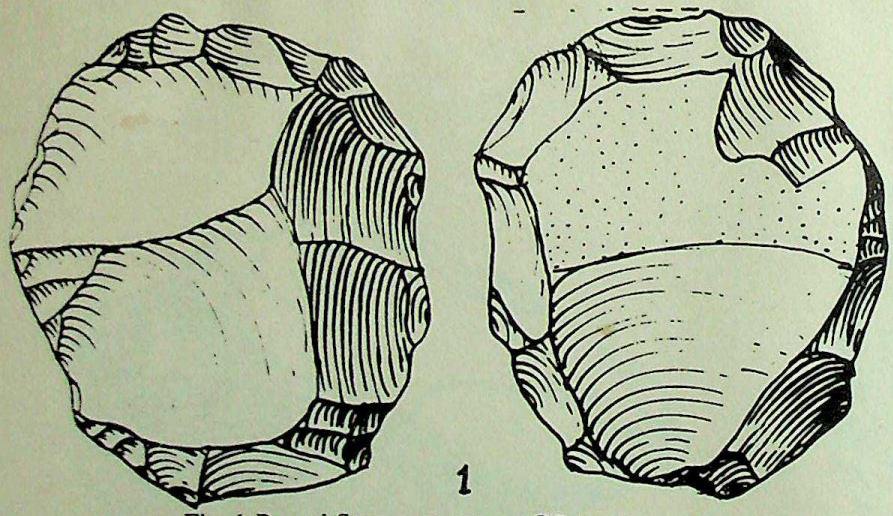
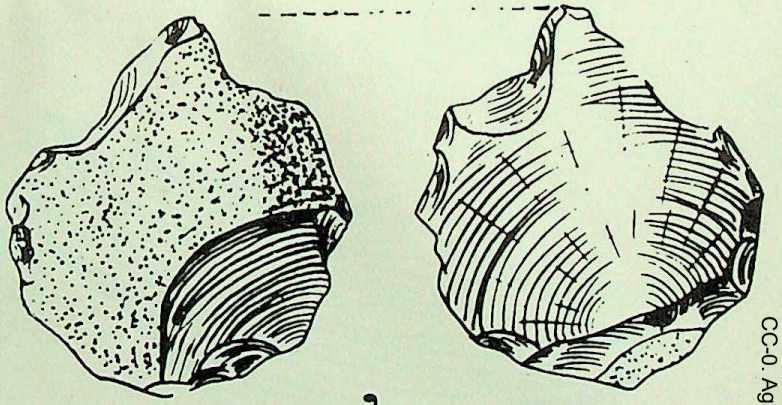


1

Fig. 1 Round Scraper on core : GRA—3

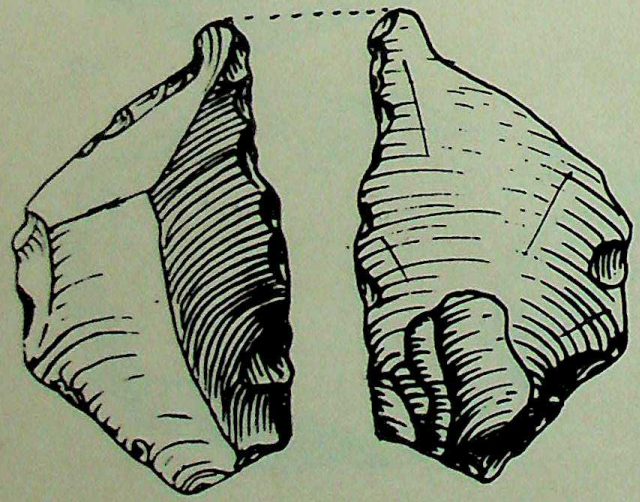
Fig. 2 Borer : GTA—11

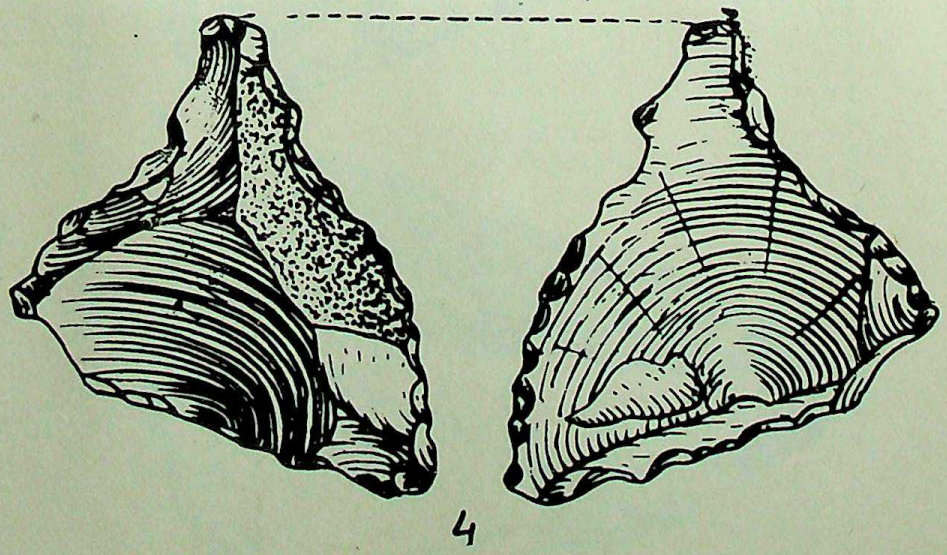


2

Fig. 3 Borer & Single-sided side scraper on flake : AOT-11

Fig. 4 Borer & Round Scraper on Flake : SHL—60





4

Plate LIX

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Plate LV

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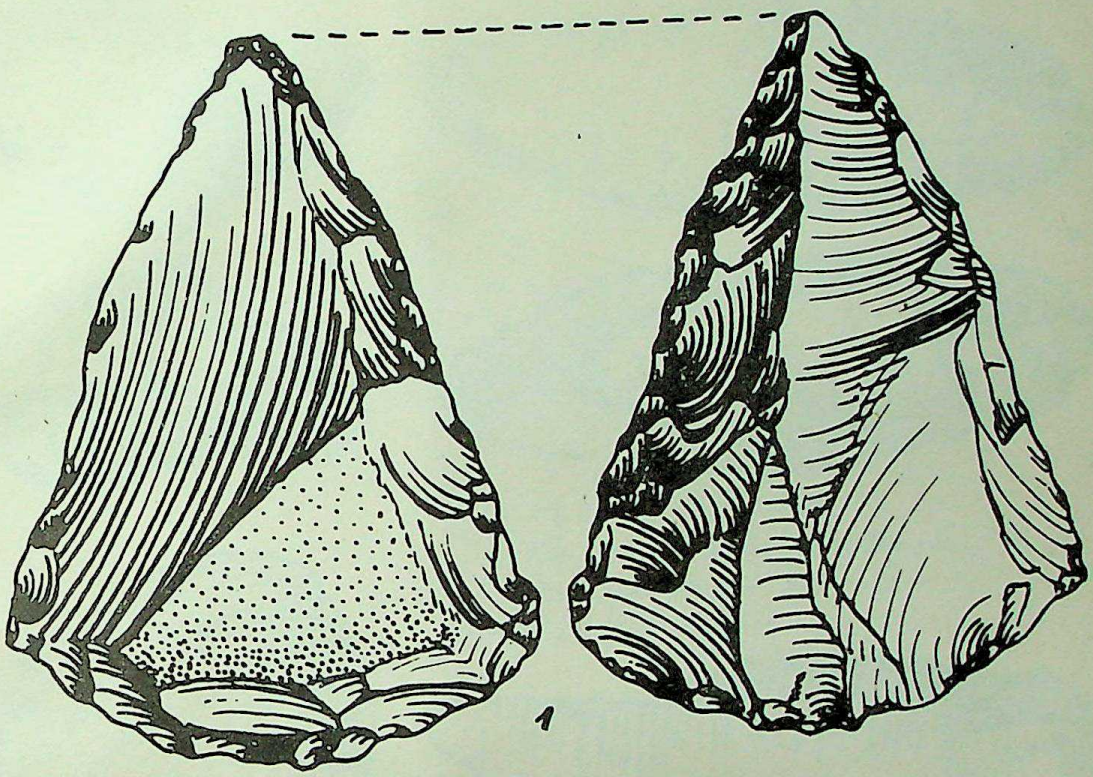

Fig. 1 Point on Core : PNA—7

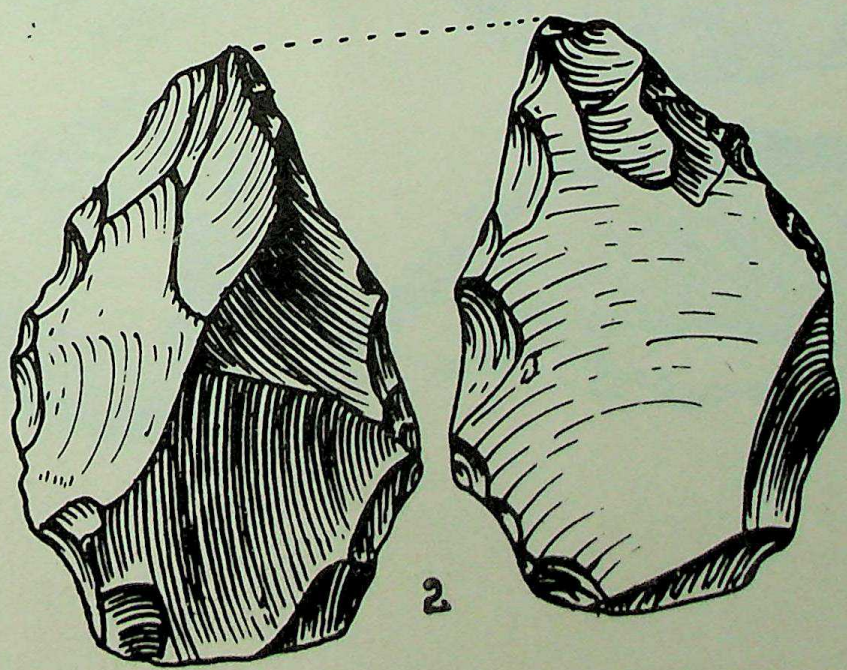

Fig. 2 Point on Flake : DRA—3

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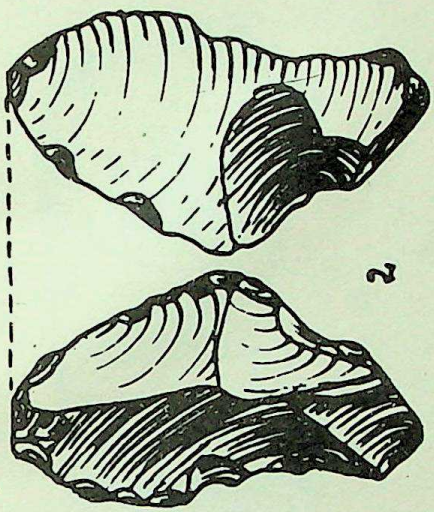
Plate LVI



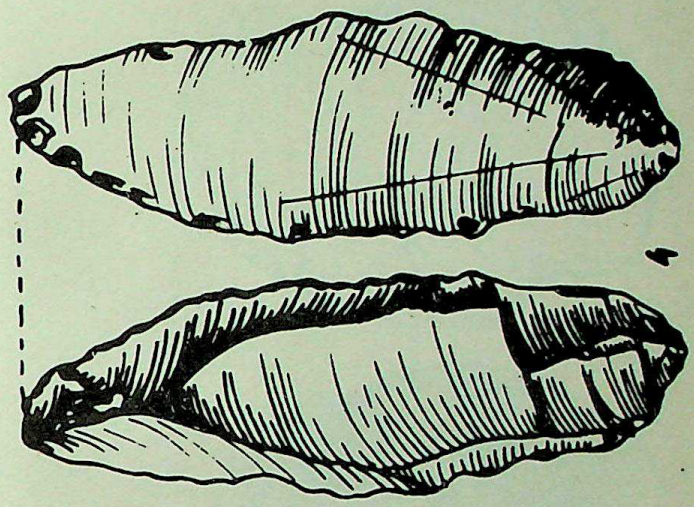
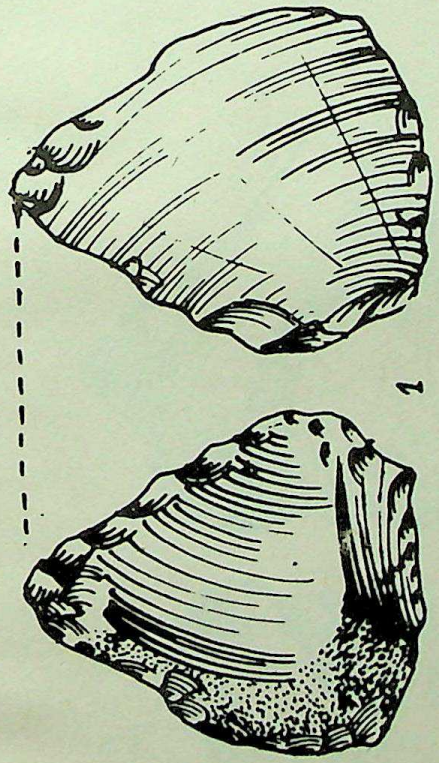


Fig. 1 Point on Flake : APR—5

Fig. 2 Tanged Point on Flake : SHL—61

Fig. 3 Blade-like flake : BBI(1)—21

Fig. 4 Blade : JDA—28



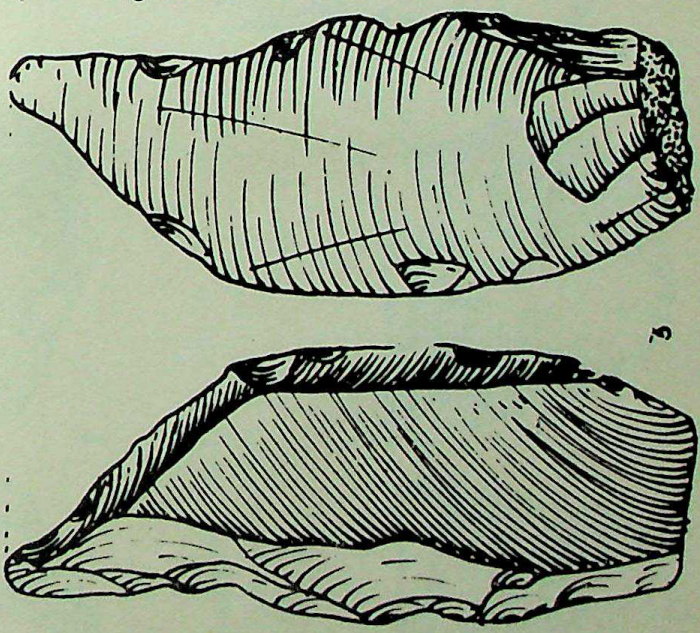


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Plate LVII

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Fig. 1 Faceted Plateform Flake : SD1—8
Fig. 2-4 Levalloisian Flakes : GRA—31; APR—7; PNA—4

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Fig. 1 Single-sided Side Scraper on core : BBI(11)-5 Figs. 2-7 S.S.S. On flake : KPR—11; BBI(11)—117; SDL—51; HNI—232; HNI—224 Fig. 8 Double-sided Side Scraper on Flake : HNI-209

Fig. 9 Single Hollow Scraper on Flake : BHI—29 Fig. 10 Double-Hollow scraper on Flake : MJA—11 Fig. 11 End Scraper on Core : BHI—19 Figs. 12-13 E.S. On Flake : LPR—12; HNI—32

Fig.14 Single-ided side and End scraper on flake : JDAH-21 g. 15 Double-sided Side and End Scraper on Core GRI-2

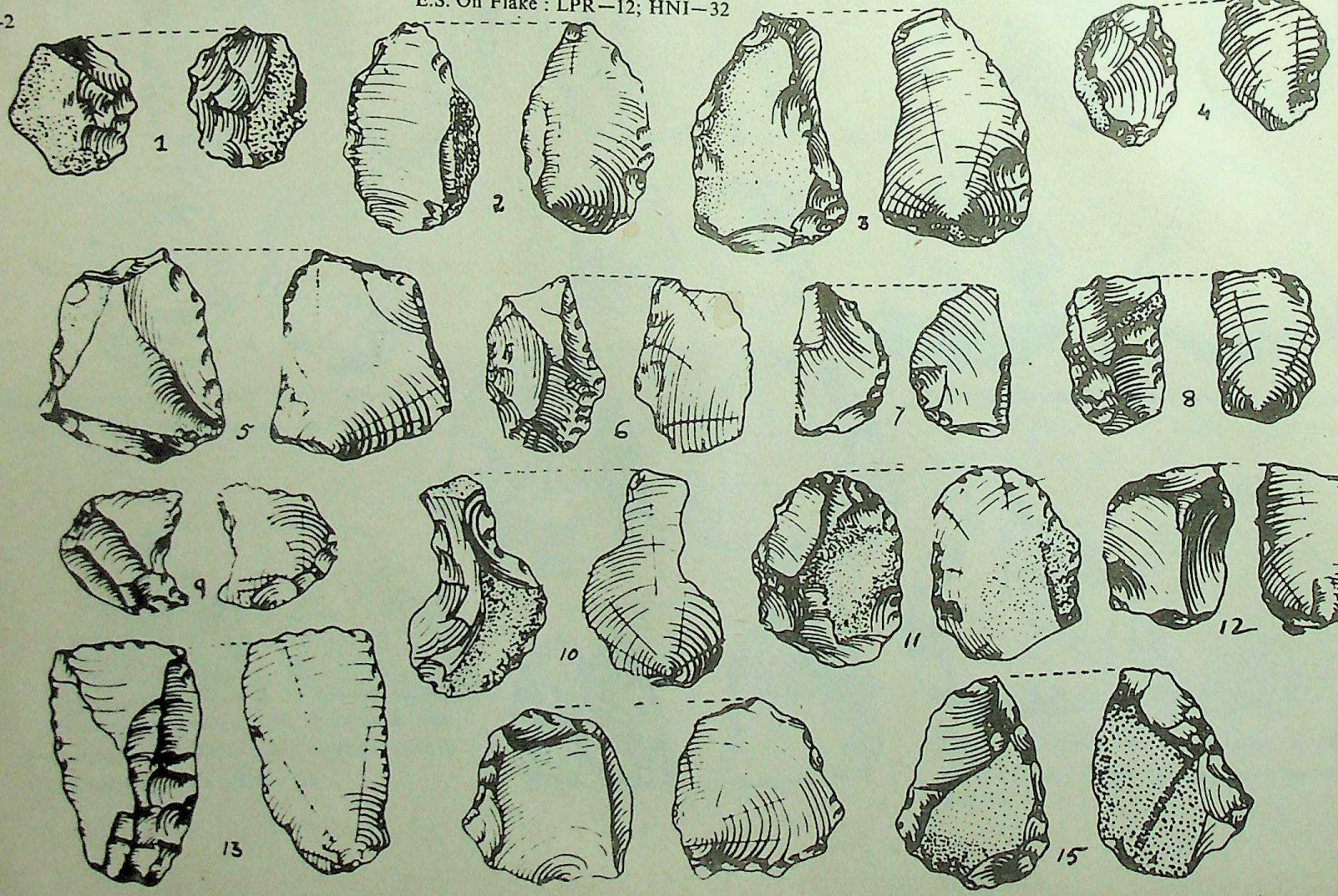

Plate LVIII

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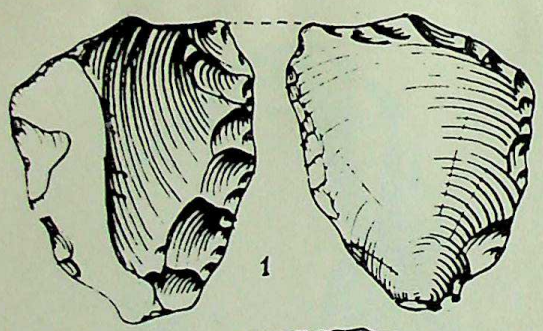
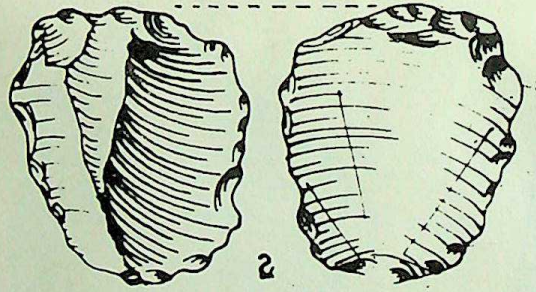
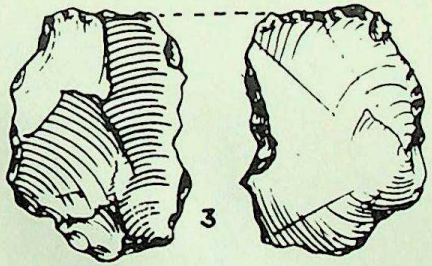
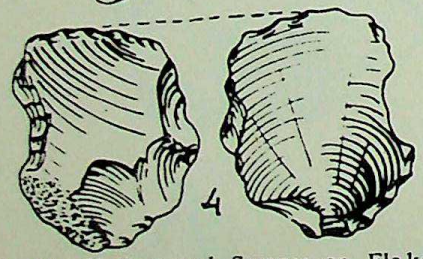
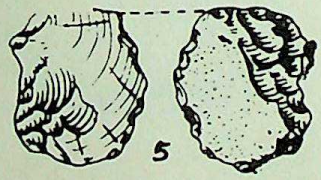










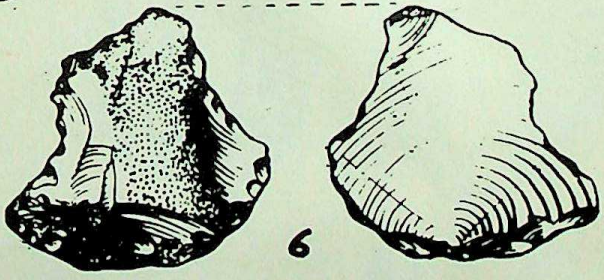
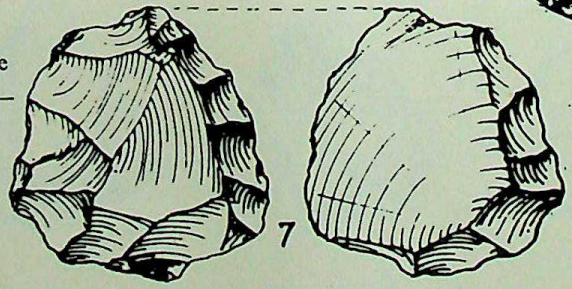
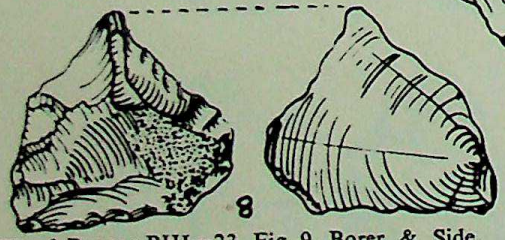


Fig. 6 Double Hollow and Scraper on Flake HNI—91 Fig. 7 Round Scraper on Flake : BSI—45

Figs. 1-2 Double-sided Side Scraper on Flake : URA—14; BDA—21 Fig.3 Single Hollow & End Scraper on Flake : SHL—127





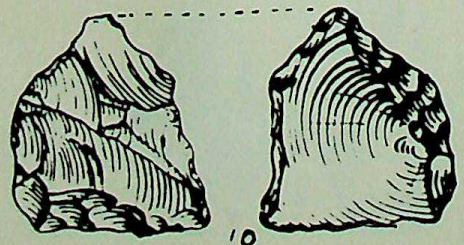


Fig. 8 Borer : BHI—23 Fig. 9 Borer & Side Scraper on Flake : KNR—5 Fig. 10 Borer, Side & End Scraper on Flake : HNI—215

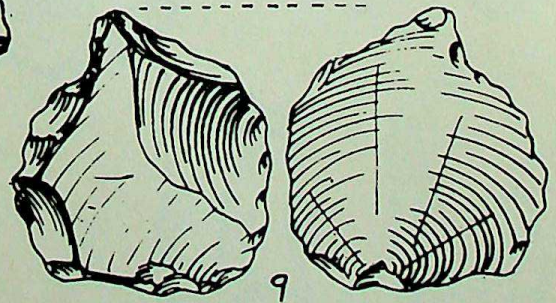


Fig. 4 Side Hollow & End Scraper on Flake : SHL—37 Fig. 5 Side & Hollow Scraper on Flake : BHI—31

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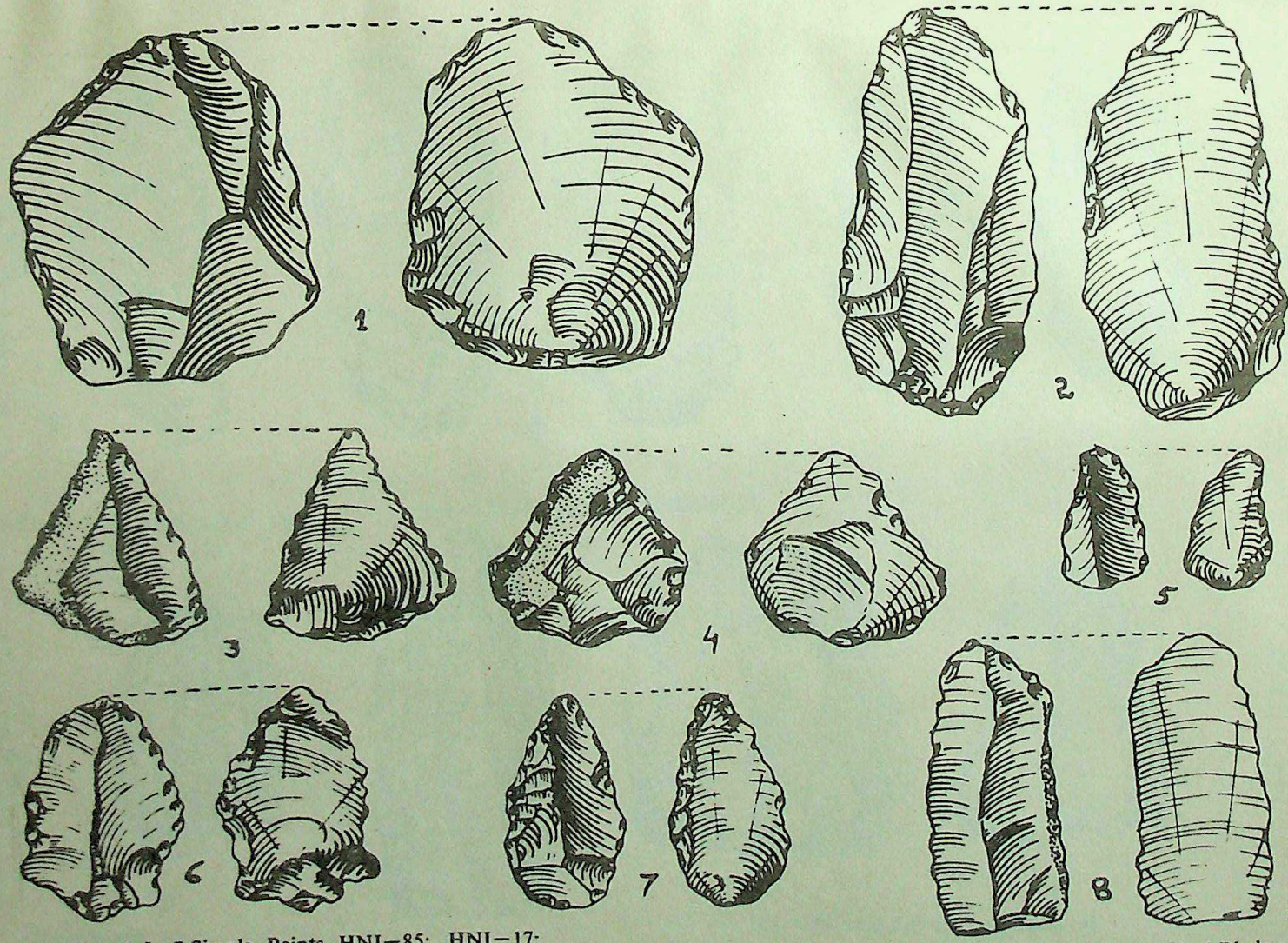

Figs. 1-5, 7 Simple Points HNI—85; HNI—17; SHL—111; BLI—8; BNA—3; LPR—38

Tanged Point : HNI—65 Fig.8 Vsed Blade : HNI-34

Plate LX

Fig. 6

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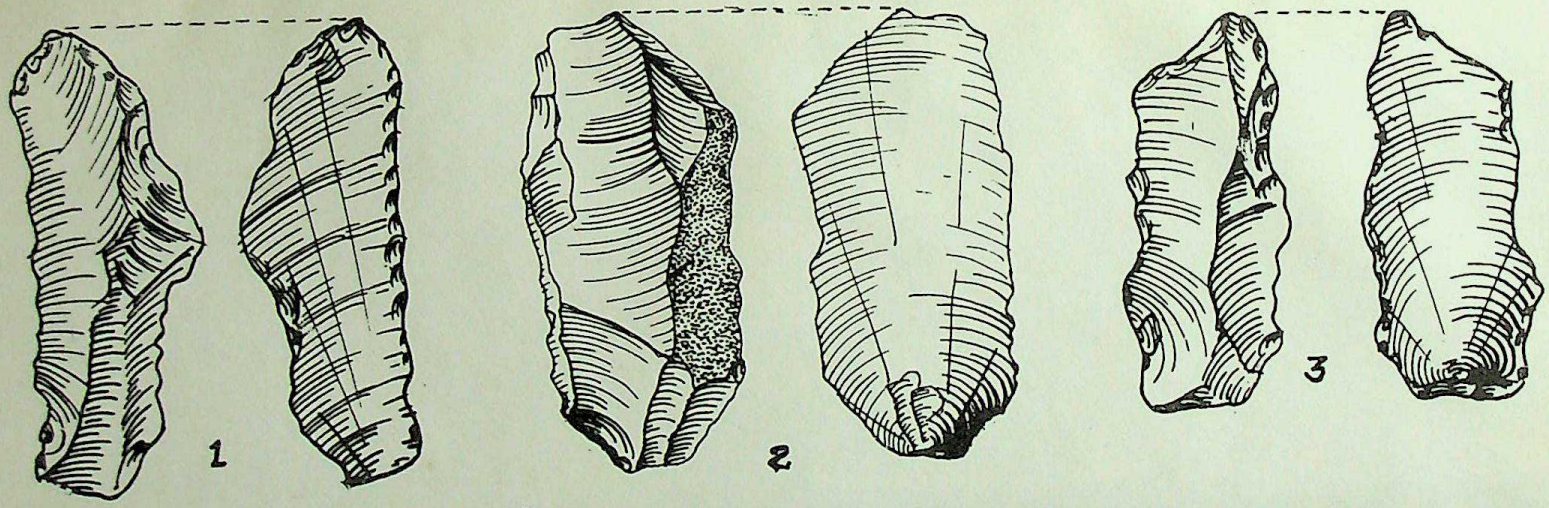
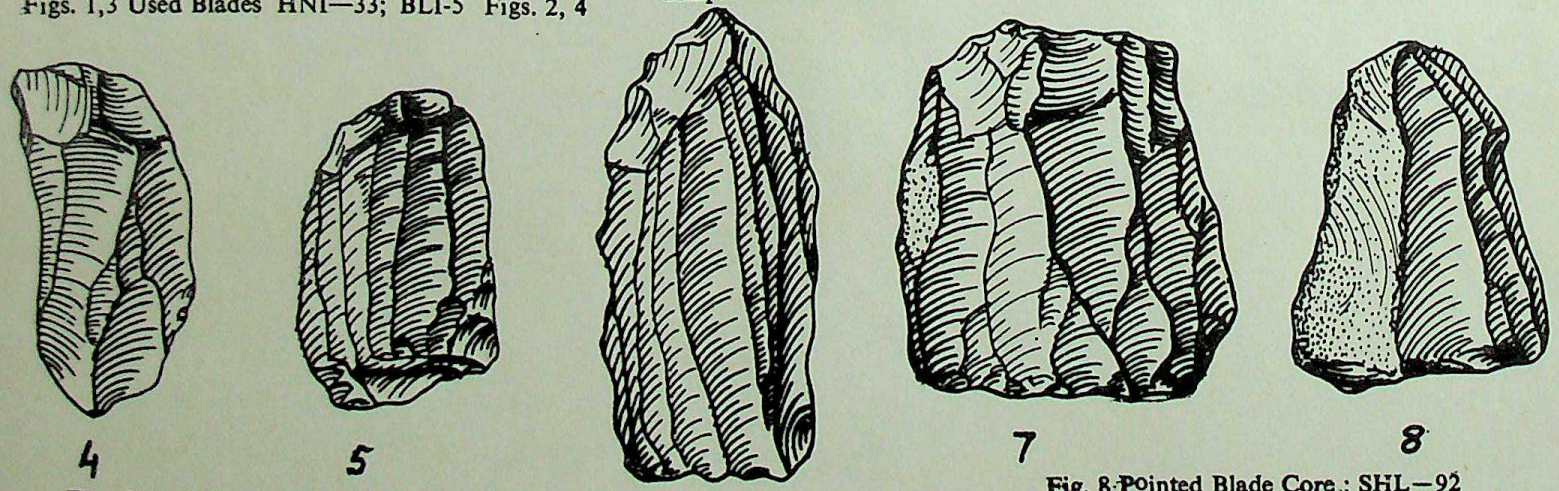


Figs. 1,3 Used Blades HNI—33; BLI-5 Figs. 2, 4 Simple Blades : KRR—2; KRR—28



Figs 5-6 Oblique-ended Blade Cores : HNI—9; HNI—2; Fig. 7 Flate-based Blade Core : HNI—1

Fig. 8 Pointed Blade Core : SHL—92

Plate LXI

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